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# Appendix (I-XII)

## From Simultaneous Equations (16) and (17) Determine $f=\frac{a_{41}}{a_{11}}$ and $\varphi=\frac{a_{44}}{a_{11}}$

$$\frac{C_x(a_{11}-C_x a_{41})}{(va_{11}+C_x a_{44})}=\frac{(C_{ax}-v)a_{11}}{(a_{44}+C_{ax}a_{41})C_{ax}} \quad \text{....................(16)}$$

$$\frac{C_{-x}(a_{11}+C_{-x}a_{41})}{(-va_{11}+C_{-x}a_{44})}=\frac{(C_{-ax}+v)a_{11}}{(a_{44}-C_{-ax}a_{41})C_{-ax}} \quad \text{....................(17)}$$

Set $f=\frac{a_{41}}{a_{11}}$, $\varphi=\frac{a_{44}}{a_{11}}$, $a=C_{-ax}$, $b=C_{ax}$, $c=C_{-x}$, $d=C_x$ then (16) and (17) become

$$\frac{d(1-df)}{(v+d\varphi)}=\frac{(b-v)}{(\varphi+bf)b} \quad \text{....................(16)}$$

$$\frac{c(1+cf)}{(-v+c\varphi)}=\frac{(a+v)}{(\varphi-af)a} \quad \text{....................(17)}$$

Take (16) from the theorem of proportion by equality set $\lambda_1=1$ and $\lambda_2=-1$ we get

$$\frac{(1-df)}{(\frac{v}{d}+\varphi)}=\frac{(1-\frac{v}{b})}{(\varphi+bf)}=\frac{(1-df)-(1-\frac{v}{b})}{(\frac{v}{d}+\varphi)-(\varphi+bf)}=\frac{(\frac{v}{b}-df)}{(\frac{v}{d}-bf)}.$$

On the other hand $\frac{(1-\frac{v}{b})}{(\varphi+bf)}=\frac{(\frac{v}{b}-df)}{(\frac{v}{d}-bf)}$ namely $(\varphi+bf)=(1-\frac{v}{b})\frac{(\frac{v}{d}-bf)}{(\frac{v}{b}-df)}$, then we get $\varphi=(1-\frac{v}{b})\frac{(\frac{v}{d}-bf)}{(\frac{v}{b}-df)}-bf$.

Analogously take (17) from the theorem of proportion by equality analogously set $\lambda_1=1$ and $\lambda_2=-1$ we get

$$\frac{(1+cf)}{(-\frac{v}{c}+\varphi)}=\frac{(1+\frac{v}{a})}{(\varphi-af)}=\frac{(1+cf)-(1+\frac{v}{a})}{(-\frac{v}{c}+\varphi)-(\varphi-af)}=\frac{(cf-\frac{v}{a})}{(-\frac{v}{c}+af)}.$$

Analogously $\frac{(1+\frac{v}{a})}{(\varphi-af)}=\frac{(cf-\frac{v}{a})}{(-\frac{v}{c}+af)}$ namely $(\varphi-af)=(1+\frac{v}{a})\frac{(af-\frac{v}{c})}{(cf-\frac{v}{a})}$, then we get $\varphi=(1+\frac{v}{a})\frac{(af-\frac{v}{c})}{(cf-\frac{v}{a})}+af$.

The $\varphi$ obtained from (17) should be equal to the $\varphi$ obtained from (16), then we get the equation about $f$

$$(1+\frac{v}{a})\frac{(af-\frac{v}{c})}{(cf-\frac{v}{a})}+af=(1-\frac{v}{b})\frac{(\frac{v}{d}-bf)}{(\frac{v}{b}-df)}-bf$$

namely $$\frac{(1+\frac{v}{a})(af-\frac{v}{c})}{(cf-\frac{v}{a})}+af\frac{(cf-\frac{v}{a})}{(cf-\frac{v}{a})}=\frac{(1-\frac{v}{b})(\frac{v}{d}-bf)}{(\frac{v}{b}-df)}-bf\frac{(\frac{v}{b}-df)}{(\frac{v}{b}-df)}$$

namely $$\frac{(1+\frac{v}{a})(af-\frac{v}{c})+af(cf-\frac{v}{a})}{(cf-\frac{v}{a})}=\frac{(1-\frac{v}{b})(\frac{v}{d}-bf)-bf(\frac{v}{b}-df)}{(\frac{v}{b}-df)}$$

namely $$\frac{af(1+\frac{v}{a})-\frac{v}{c}(1+\frac{v}{a})+af(cf-\frac{v}{a})}{(cf-\frac{v}{a})}=\frac{\frac{v}{d}(1-\frac{v}{b})-bf(1-\frac{v}{b})-bf(\frac{v}{b}-df)}{(\frac{v}{b}-df)}$$

namely $$\frac{acf^{2}+af-\frac{v}{c}(1+\frac{v}{a})}{(cf-\frac{v}{a})}=\frac{\frac{v}{d}(1-\frac{v}{b})-bf+bdf^{2}}{(\frac{v}{b}-df)}$$

namely $$(\frac{v}{b}-df)\left[acf^{2}+af-\frac{v}{c}(1+\frac{v}{a})\right]=(cf-\frac{v}{a})\left[\frac{v}{d}(1-\frac{v}{b})-bf+bdf^{2}\right]$$

namely $$\frac{v}{b}\left[acf^{2}+af-\frac{v}{c}(1+\frac{v}{a})\right]-df\left[acf^{2}+af-\frac{v}{c}(1+\frac{v}{a})\right]$$

$$=cf\left[\frac{v}{d}(1-\frac{v}{b})-bf+bdf^{2}\right]-\frac{v}{a}\left[\frac{v}{d}(1-\frac{v}{b})-bf+bdf^{2}\right]$$

namely $$\frac{v}{b}\left[acf^{2}+af-\frac{v}{c}(1+\frac{v}{a})\right]-f\left[acdf^{2}+adf-d\frac{v}{c}(1+\frac{v}{a})\right]$$

$$=f\left[c\frac{v}{d}(1-\frac{v}{b})-bcf+bcdf^{2}\right]-\frac{v}{a}\left[\frac{v}{d}(1-\frac{v}{b})-bf+bdf^{2}\right]$$

namely 0=

$$f\left[c\frac{v}{d}(1-\frac{v}{b})-bcf+bcdf^{2}+acdf^{2}+adf-d\frac{v}{c}(1+\frac{v}{a})\right]$$

$$-\frac{v}{a}\left[\frac{v}{d}(1-\frac{v}{b})-bf+bdf^{2}\right]-\frac{v}{b}\left[acf^{2}+af-\frac{v}{c}(1+\frac{v}{a})\right]$$

namely

$$0=$$

$$f\left[+(b+a)cdf^{2}+(ad-bc)f+c\frac{v}{d}(1-\frac{v}{b})-d\frac{v}{c}(1+\frac{v}{a})\right]$$

$$-\frac{v}{a}\left[\frac{v}{d}(1-\frac{v}{b})-bf+bdf^{2}\right]-\frac{v}{b}\left[acf^{2}+af-\frac{v}{c}(1+\frac{v}{a})\right]$$

namely

$$0 =$$
$$+(b+a)cdf^{3}$$
$$f\left[(ad-bc-\frac{v}{a}bd-\frac{v}{b}ac)f+c\frac{v}{d}(1-\frac{v}{b})-d\frac{v}{c}(1+\frac{v}{a})+\frac{v}{a}b-\frac{v}{b}a\right]$$
$$-\frac{v^2}{ad}(1-\frac{v}{b})+\frac{v^2}{bc}(1+\frac{v}{a})$$

namely

$$0 =$$
$$f^{3}(a+b)cd$$
$$-f^{2}\left[(bc-ad)+v\left(\frac{ac}{b}+\frac{bd}{a}\right)\right]$$
$$+fv\left[\left(\frac{c}{d}-\frac{d}{c}+\frac{b}{a}-\frac{a}{b}\right)-v(\frac{c}{bd}+\frac{d}{ac})\right]$$
$$+v^{2}\left[\left(\frac{1}{bc}-\frac{1}{ad}\right)+\frac{v}{ab}\left(\frac{1}{c}+\frac{1}{d}\right)\right]$$

It can be checked that both $\frac{v}{ac}$ and $\frac{v}{bd}$ are the root of the equation above about *f*. Divided both sides of the equal sign of the equation above with $\left(f-\frac{v}{ac}\right)$ we can take $f^{2}(a+b)cd$ as the quotient:

$$\begin{array}{r|l} & f^{2}(a+b)cd \\ \hline (f-\frac{v}{ac}) & f^{3}(a+b)cd-f^{2}\left[(bc-ad)+v\left(\frac{ac}{b}+\frac{bd}{a}\right)\right] \\ & +fv\left[\left(\frac{c}{d}-\frac{d}{c}+\frac{b}{a}-\frac{a}{b}\right)-v(\frac{c}{bd}+\frac{d}{ac})\right]+v^{2}\left[\left(\frac{1}{bc}-\frac{1}{ad}\right)+\frac{v}{ab}\left(\frac{1}{c}+\frac{1}{d}\right)\right] \\ & \underline{f^{3}(a+b)cd-f^{2}(a+b)cd\frac{v}{ac}} \\ & -f^{2}\left[(bc-ad)+v\left(\frac{ac}{b}+\frac{bd}{a}\right)-(a+b)cd\frac{v}{ac}\right] \\ & +fv\left[\left(\frac{c}{d}-\frac{d}{c}+\frac{b}{a}-\frac{a}{b}\right)-v(\frac{c}{bd}+\frac{d}{ac})\right]+v^{2}\left[\left(\frac{1}{bc}-\frac{1}{ad}\right)+\frac{v}{ab}\left(\frac{1}{c}+\frac{1}{d}\right)\right] \end{array}$$

i.e.

$$f^{2}(a+b)cd$$

$$(f-\frac{v}{ac})\,\Big)\; f^{3}(a+b)cd - f^{2}\left[(bc-ad)+v\left(\frac{ac}{b}+\frac{bd}{a}\right)\right]$$

$$+ fv\left[\left(\frac{c}{d}-\frac{d}{c}+\frac{b}{a}-\frac{a}{b}\right)-v(\frac{c}{bd}+\frac{d}{ac})\right]+v^{2}\left[\left(\frac{1}{bc}-\frac{1}{ad}\right)+\frac{v}{ab}\left(\frac{1}{c}+\frac{1}{d}\right)\right]$$

$$f^{3}(a+b)cd - f^{2}(a+b)cd\,\frac{v}{ac}$$

$$- f^{2}\left[(bc-ad)+v\left(\frac{ac}{b}-d\right)\right]$$

$$+ fv\left[\left(\frac{c}{d}-\frac{d}{c}+\frac{b}{a}-\frac{a}{b}\right)-v(\frac{c}{bd}+\frac{d}{ac})\right]+v^{2}\left[\left(\frac{1}{bc}-\frac{1}{ad}\right)+\frac{v}{ab}\left(\frac{1}{c}+\frac{1}{d}\right)\right]$$

Then we can take $-f\left[(bc-ad)+v\left(\frac{ac}{b}-d\right)\right]$ as the quotient and the formula above goes to

$$f^{2}(a+b)cd - f\left[(bc-ad)+v\left(\frac{ac}{b}-d\right)\right]$$

$$(f-\frac{v}{ac})\,\Big)\; f^{3}(a+b)cd - f^{2}\left[(bc-ad)+v\left(\frac{ac}{b}+\frac{bd}{a}\right)\right]$$

$$+ fv\left[\left(\frac{c}{d}-\frac{d}{c}+\frac{b}{a}-\frac{a}{b}\right)-v(\frac{c}{bd}+\frac{d}{ac})\right]+v^{2}\left[\left(\frac{1}{bc}-\frac{1}{ad}\right)+\frac{v}{ab}\left(\frac{1}{c}+\frac{1}{d}\right)\right]$$

$$f^{3}(a+b)cd - f^{2}(a+b)cd\,\frac{v}{ac}$$

$$- f^{2}\left[(bc-ad)+v\left(\frac{ac}{b}-d\right)\right]$$

$$+ fv\left[\left(\frac{c}{d}-\frac{d}{c}+\frac{b}{a}-\frac{a}{b}\right)-v(\frac{c}{bd}+\frac{d}{ac})\right]+v^{2}\left[\left(\frac{1}{bc}-\frac{1}{ad}\right)+\frac{v}{ab}\left(\frac{1}{c}+\frac{1}{d}\right)\right]$$

$$- f^{2}\left[(bc-ad)+v\left(\frac{ac}{b}-d\right)\right]+\frac{fv}{ac}\left[(bc-ad)+v\left(\frac{ac}{b}-d\right)\right]$$

$$fv\left[\left(\frac{c}{d}-\frac{d}{c}+\frac{b}{a}-\frac{a}{b}\right)-v(\frac{c}{bd}+\frac{d}{ac})-\frac{(bc-ad)}{ac}-\frac{v}{ac}\left(\frac{ac}{b}-d\right)\right]$$

$$+v^{2}\left[\left(\frac{1}{bc}-\frac{1}{ad}\right)+\frac{v}{ab}\left(\frac{1}{c}+\frac{1}{d}\right)\right]$$

i.e.

$$f^{2}(a+b)cd - f\left[(bc-ad)+v\left(\frac{ac}{b}-d\right)\right]$$

$$(f-\frac{v}{ac})\overline{\Big) f^{3}(a+b)cd - f^{2}\left[(bc-ad)+v\left(\frac{ac}{b}+\frac{bd}{a}\right)\right]}$$

$$+ fv\left[\left(\frac{c}{d}-\frac{d}{c}+\frac{b}{a}-\frac{a}{b}\right)-v(\frac{c}{bd}+\frac{d}{ac})\right]+v^{2}\left[\left(\frac{1}{bc}-\frac{1}{ad}\right)+\frac{v}{ab}\left(\frac{1}{c}+\frac{1}{d}\right)\right]$$

$$\underline{f^{3}(a+b)cd - f^{2}(a+b)cd\,\frac{v}{ac}}$$

$$- f^{2}\left[(bc-ad)+v\left(\frac{ac}{b}-d\right)\right]$$

$$+ fv\left[\left(\frac{c}{d}-\frac{d}{c}+\frac{b}{a}-\frac{a}{b}\right)-v(\frac{c}{bd}+\frac{d}{ac})\right]+v^{2}\left[\left(\frac{1}{bc}-\frac{1}{ad}\right)+\frac{v}{ab}\left(\frac{1}{c}+\frac{1}{d}\right)\right]$$

$$\underline{- f^{2}\left[(bc-ad)+v\left(\frac{ac}{b}-d\right)\right]+\frac{fv}{ac}\left[(bc-ad)+v\left(\frac{ac}{b}-d\right)\right]}$$

$$fv\left[\left(\frac{c}{d}-\frac{a}{b}\right)-v(\frac{c}{bd}+\frac{1}{b})\right]+v^{2}\left[\left(\frac{1}{bc}-\frac{1}{ad}\right)+\frac{v}{ab}\left(\frac{1}{c}+\frac{1}{d}\right)\right]$$

Then we can take quotient $v\left[\left(\frac{c}{d}-\frac{a}{b}\right)-v(\frac{c}{bd}+\frac{1}{b})\right]$ and the formula above goes to

$$f^{2}(a+b)cd - f\left[(bc-ad)+v\left(\frac{ac}{b}-d\right)\right]+v\left[\left(\frac{c}{d}-\frac{a}{b}\right)-v(\frac{c}{bd}+\frac{1}{b})\right]$$

$$(f-\frac{v}{ac})\overline{\Big) f^{3}(a+b)cd - f^{2}\left[(bc-ad)+v\left(\frac{ac}{b}+\frac{bd}{a}\right)\right]}$$

$$+ fv\left[\left(\frac{c}{d}-\frac{d}{c}+\frac{b}{a}-\frac{a}{b}\right)-v(\frac{c}{bd}+\frac{d}{ac})\right]+v^{2}\left[\left(\frac{1}{bc}-\frac{1}{ad}\right)+\frac{v}{ab}\left(\frac{1}{c}+\frac{1}{d}\right)\right]$$

$$\underline{f^{3}(a+b)cd - f^{2}(a+b)cd\,\frac{v}{ac}}$$

$$- f^{2}\left[(bc-ad)+v\left(\frac{ac}{b}-d\right)\right]$$

$$+ fv\left[\left(\frac{c}{d}-\frac{d}{c}+\frac{b}{a}-\frac{a}{b}\right)-v(\frac{c}{bd}+\frac{d}{ac})\right]+v^{2}\left[\left(\frac{1}{bc}-\frac{1}{ad}\right)+\frac{v}{ab}\left(\frac{1}{c}+\frac{1}{d}\right)\right]$$

$$\underline{- f^{2}\left[(bc-ad)+v\left(\frac{ac}{b}-d\right)\right]+\frac{fv}{ac}\left[(bc-ad)+v\left(\frac{ac}{b}-d\right)\right]}$$

$$fv\left[\left(\frac{c}{d}-\frac{a}{b}\right)-v(\frac{c}{bd}+\frac{1}{b})\right]+v^{2}\left[\left(\frac{1}{bc}-\frac{1}{ad}\right)+\frac{v}{ab}\left(\frac{1}{c}+\frac{1}{d}\right)\right]$$

$$\underline{fv\left[\left(\frac{c}{d}-\frac{a}{b}\right)-v(\frac{c}{bd}+\frac{1}{b})\right]-\frac{v^{2}}{ac}\left[\left(\frac{c}{d}-\frac{a}{b}\right)-v(\frac{c}{bd}+\frac{1}{b})\right]}$$

$$0$$

We can see the original equation becomes

$$0 = f^2(a+b)cd - f\left[(bc-ad)+v\left(\frac{ac}{b}-d\right)\right] + v\left[\left(\frac{c}{d}-\frac{a}{b}\right) - v(\frac{c}{bd}+\frac{1}{b})\right]$$

Then, divided both sides of the equal sign of the equation above with $\left(f-\frac{v}{bd}\right)$ i.e.

$$(f-\frac{v}{bd})\,\Big)\, f^2(a+b)cd - f\left[(bc-ad)+v\left(\frac{ac}{b}-d\right)\right] + v\left[\left(\frac{c}{d}-\frac{a}{b}\right) - v(\frac{c}{bd}+\frac{1}{b})\right]$$

We can take $f(a+b)cd$ as the quotient i.e.

$$f(a+b)cd$$

$$(f-\frac{v}{bd})\,\Big)\, f^2(a+b)cd - f\left[(bc-ad)+v\left(\frac{ac}{b}-d\right)\right] + v\left[\left(\frac{c}{d}-\frac{a}{b}\right) - v(\frac{c}{bd}+\frac{1}{b})\right]$$

$$\underline{f^2(a+b)cd - \frac{v}{bd}f(a+b)cd}$$

$$-f\left[(bc-ad)+v\left(\frac{ac}{b}-d\right) - \frac{v}{bd}(a+b)cd\right] + v\left[\left(\frac{c}{d}-\frac{a}{b}\right) - v(\frac{c}{bd}+\frac{1}{b})\right]$$

i.e.

$$f(a+b)cd$$

$$(f-\frac{v}{bd})\,\Big)\, f^2(a+b)cd - f\left[(bc-ad)+v\left(\frac{ac}{b}-d\right)\right] + v\left[\left(\frac{c}{d}-\frac{a}{b}\right) - v(\frac{c}{bd}+\frac{1}{b})\right]$$

$$\underline{f^2(a+b)cd - f(a+b)cd\,\frac{v}{bd}}$$

$$-f\left[(bc-ad)+v(-c-d)\right] + v\left[\left(\frac{c}{d}-\frac{a}{b}\right) - v(\frac{c}{bd}+\frac{1}{b})\right]$$

We can take $-\left[(bc-ad)+v(-c-d)\right]$ as the quotient, the equation above becomes

$$f(a+b)cd - \left[(bc-ad)+v(-c-d)\right]$$

$$(f-\frac{v}{bd})\,\Big)\, f^2(a+b)cd - f\left[(bc-ad)+v\left(\frac{ac}{b}-d\right)\right] + v\left[\left(\frac{c}{d}-\frac{a}{b}\right) - v(\frac{c}{bd}+\frac{1}{b})\right]$$

$$\underline{f^2(a+b)cd - f(a+b)cd\,\frac{v}{bd}}$$

$$-f\left[(bc-ad)+v(-c-d)\right] + v\left[\left(\frac{c}{d}-\frac{a}{b}\right) - v(\frac{c}{bd}+\frac{1}{b})\right]$$

$$\underline{-f\left[(bc-ad)+v(-c-d)\right] + \frac{v}{bd}\left[(bc-ad)+v(-c-d)\right]}$$

$$0$$

The remainder is zero, the original equation becomes

$$0 = f(a+b)cd - \left[(bc-ad) + v(-c-d)\right]$$

namely

$$f_3 = \frac{(bc-ad) - v(d+c)}{cd(a+b)}$$

bring $f_1 = \frac{v}{ac}$ or $f_2 = \frac{v}{bd}$ or $f_3 = \frac{(bc-ad) - v(d+c)}{cd(a+b)}$ into (16) or (17) we can correspondingly obtain $\varphi_1$ or $\varphi_2$ or $\varphi_3$.

## Prove that (23)″ Comes from (21) Minus (22) Plus (20) and in Different Octant (21) and (22) will Change But (23)″ is Unchanged in form

a. in the first octant (20) and (19) are（note (23) will be unchanged in form in any octant）

$$\frac{r}{C_r} + \frac{r}{C_{-r}} = \frac{2r}{C} \quad \text{.....................(20).}$$

$$\frac{r}{C_r} + \frac{z}{C_{-z}} + \frac{y}{C_{-y}} + \frac{x}{C_{-x}} = \frac{r+z+y+x}{C} \quad \text{.....................(21)}$$

$$\frac{x}{C_x} + \frac{y}{C_y} + \frac{z}{C_z} + \frac{r}{C_{-r}} = \frac{x+y+z+r}{C} \quad \text{.....................(22)}$$

From (21) minus (22) plus (20) we obtain (please note $C_{-y} = C_y$ and $C_{-z} = C_z$)

$$2\frac{r}{C_r} + x\left(\frac{1}{C_{-x}} - \frac{1}{C_x}\right) = \frac{2r}{C} \quad \text{.....................(23)″}$$

b. In the 2nd octant（the $x$ is negative）, Adopt the absolute value list the equation (21) and (22) are (note the direction of the light rays)

$$\frac{r}{C_r} + \frac{z}{C_{-z}} + \frac{y}{C_{-y}} + \frac{-x}{C_x} = \frac{r+z+y-x}{C} \quad \text{.....................(21)′}$$

$$\frac{-x}{C_{-x}} + \frac{y}{C_y} + \frac{z}{C_z} + \frac{r}{C_{-r}} = \frac{-x+y+z+r}{C} \quad \text{.....................(22)′}$$

From (21)′ minus (22)′ plus (20) we obtain

$$2\frac{r}{C_r} + x\left(\frac{1}{C_{-x}} - \frac{1}{C_x}\right) = \frac{2r}{C} \quad \text{.....................(23)″}$$

It is analogous in other octant, so we omit them.

## Bring (19) into (23), the (23)″ will go to (23)′

Divided both sides of the equal sign of the equation (23)″ with $r$, (23)″ will become

$$\frac{2}{C_r} + \left(\frac{1}{C_{-x}} - \frac{1}{C_x}\right)\cos\alpha = \frac{2}{C}$$

Bring (19) into the equation above we obtain $\frac{2}{C_r} + \left(\frac{1}{C_{-x}} - \frac{1}{C_x}\right)\cos\alpha = \frac{1}{C_{-x}} + \frac{1}{C_x}$

i.e. $\frac{2}{C_r}=\frac{1}{C_{-x}}+\frac{1}{C_x}-(\frac{1}{C_{-x}}-\frac{1}{C_x})\cos\alpha$

i.e. $\frac{2}{C_r}=\frac{(C_{-x}+C_x)+(C_{-x}-C_x)\cos\alpha}{C_{-x}C_x}$

Taking note of that (19) i.e. $\frac{1}{C_{-x}}+\frac{1}{C_x}=\frac{C_{-x}+C_x}{C_{-x}C_x}=\frac{2}{C}$ or $C_{-x}C_x=\frac{(C_{-x}+C_x)C}{2}$

therefore $\frac{2}{C_r}=\frac{(C_{-x}+C_x)+(C_{-x}-C_x)\cos\alpha}{C_{-x}C_x}=\frac{(C_{-x}+C_x)+(C_{-x}-C_x)\cos\alpha}{\frac{(C_{-x}+C_x)C}{2}}$

i.e. $\frac{1}{C_r}=\frac{(C_{-x}+C_x)+(C_{-x}-C_x)\cos\alpha}{(C_{-x}+C_x)C}$

i.e. $C_r=\frac{C}{1+\frac{(C_{-x}-C_x)}{(C_{-x}+C_x)}\cos\alpha}$ ...................(23)′

**Bring (19) and $r=\sqrt{x^2+y^2+z^2}$ , $\frac{r}{C_r}=t$ into (23)″, the (23)″ will go to (23)**

(23)″ i.e. $2\frac{r}{C_r}+x(\frac{1}{C_{-x}}-\frac{1}{C_x})=\frac{2r}{C}$. Bring $r=\sqrt{x^2+y^2+z^2}$ and $\frac{r}{C_r}=t$ into (23)″, (23)″ will go to

$$2t+x(\frac{1}{C_{-x}}-\frac{1}{C_x})=\frac{2\sqrt{x^2+y^2+z^2}}{C}$$

i.e. $\frac{\sqrt{x^2+y^2+z^2}}{C}=t+x\frac{1}{2}\left(\frac{1}{C_{-x}}-\frac{1}{C_x}\right)$. Self-multiplying it becomes

$$\frac{x^2+y^2+z^2}{C^2}=t^2+2tx\frac{1}{2}\left(\frac{1}{C_{-x}}-\frac{1}{C_x}\right)+x^2\frac{1}{4}\left(\frac{1}{C_{-x}}-\frac{1}{C_x}\right)^2.$$

Shift the terms containing $x^2$ and $xt$ to the leftside of the equal sign of the equation above, the equation above will become

$$x^2\left[\frac{1}{C^2}-\frac{1}{4}\left(\frac{1}{C_{-x}}-\frac{1}{C_x}\right)^2\right]-2tx\frac{1}{2}\left(\frac{1}{C_{-x}}-\frac{1}{C_x}\right)+\frac{y^2+z^2}{C^2}=t^2$$

i.e. $x^2\left[\frac{1}{C}-\frac{1}{2}\left(\frac{1}{C_{-x}}-\frac{1}{C_x}\right)\right]\left[\frac{1}{C}+\frac{1}{2}\left(\frac{1}{C_{-x}}-\frac{1}{C_x}\right)\right]-2tx\frac{1}{2}\left(\frac{1}{C_{-x}}-\frac{1}{C_x}\right)+\frac{y^2+z^2}{C^2}=t^2$

Note (19) i.e. $\frac{1}{C_x}+\frac{1}{C_{-x}}=\frac{2}{C}$, therefore, $\left[\frac{1}{C}-\frac{1}{2}\left(\frac{1}{C_{-x}}-\frac{1}{C_x}\right)\right]\left[\frac{1}{C}+\frac{1}{2}\left(\frac{1}{C_{-x}}-\frac{1}{C_x}\right)\right]=\frac{1}{C_xC_{-x}}$

the equation above becomes

$$x^2\left[\left(\frac{1}{C_x}\right)\right]\left[\left(\frac{1}{C_{-x}}\right)\right]-2tx\frac{1}{2}\left(\frac{1}{C_{-x}}-\frac{1}{C_x}\right)+\frac{y^2+z^2}{C^2}=t^2,$$

i.e. $$x^2-2x\left[t\frac{1}{2}(C_x-C_{-x})\right]+\frac{(y^2+z^2)}{C^2}C_{-x}C_x=t^2\,C_{-x}C_x.$$

Now, added $\left[t\frac{1}{2}(C_x-C_{-x})\right]^2$ at both sides of the equal sign of the equation above, it will combine with the 1st term and 2nd term of the equal sign left to found a complete square term, the equation above becomes

$$\left[x-t\frac{1}{2}(C_x-C_{-x})\right]^2+\frac{(y^2+z^2)}{C^2}C_{-x}C_x=t^2\,C_{-x}C_x+\left[t\frac{1}{2}(C_x-C_{-x})\right]^2,$$

namely $$\left[x-t\frac{1}{2}(C_x-C_{-x})\right]^2+\frac{(y^2+z^2)}{C^2}C_{-x}C_x=t^2\,C_{-x}C_x+t^2\left[\frac{1}{4}(C_x^2-2C_{-x}C_x+C_{-x}^2)\right]$$

namely $$\left[x-t\frac{1}{2}(C_x-C_{-x})\right]^2+\frac{(y^2+z^2)}{C^2}C_{-x}C_x=\left[t\frac{1}{2}(C_x+C_{-x})\right]^2$$

namely $$\frac{\left[x-t\frac{1}{2}(C_x-C_{-x})\right]^2}{\left[t\frac{1}{2}(C_x+C_{-x})\right]^2}+\left(\frac{1}{C}\right)^2\frac{(y^2+z^2)C_{-x}C_x}{\left[t\frac{1}{2}(C_x+C_{-x})\right]^2}=1.$$

Note (19) i.e. $\frac{1}{C_x}+\frac{1}{C_{-x}}=\frac{2}{C}$, i.e. $\frac{1}{C}=\frac{1}{2}\left(\frac{1}{C_{-x}}+\frac{1}{C_x}\right)$, the equation above will become

$$\frac{\left[x-t\frac{1}{2}(C_x-C_{-x})\right]^2}{\left[t\frac{1}{2}(C_x+C_{-x})\right]^2}+\left[\frac{1}{2}\left(\frac{1}{C_{-x}}+\frac{1}{C_x}\right)\right]^2\frac{(y^2+z^2)C_{-x}C_x}{\left[t\frac{1}{2}(C_x+C_{-x})\right]^2}=1$$

namely $$\frac{\left[x-t\frac{1}{2}(C_x-C_{-x})\right]^2}{\left[t\frac{1}{2}(C_x+C_{-x})\right]^2}+\left[\frac{1}{2}\frac{(C_x+C_{-x})}{C_xC_{-x}}\right]^2\frac{(y^2+z^2)C_{-x}C_x}{\left[t\frac{1}{2}(C_x+C_{-x})\right]^2}=1$$

i.e. $$\frac{\left[x-t\frac{1}{2}(C_x-C_{-x})\right]^2}{\left[t\frac{1}{2}(C_x+C_{-x})\right]^2}+\frac{y^2+z^2}{t^2C_{-x}C_x}=1 \quad \text{....................(23)}$$

## Bring (1)b and $a_{22}=a_{33}=a$ into (23) We Obtain (24)a

From (23) i.e. $\dfrac{\left[x-t\frac{1}{2}(C_x-C_{-x})\right]^2}{\left[t\frac{1}{2}(C_x+C_{-x})\right]^2}+\dfrac{y^2+z^2}{t^2C_{-x}C_x}=1$, namely

$$\left[x-t\frac{1}{2}(C_x-C_{-x})\right]^2+\frac{(y^2+z^2)}{C_{-x}C_x}\left[\frac{1}{2}(C_{-x}+C_x)\right]^2=t^2\left[\frac{1}{2}(C_{-x}+C_x)\right]^2$$

Bring (1)b and $a_{22}=a_{33}=a$ into the equation above, the equation above will become

$$\left[a_{11}(x_a-vt_a)-(a_{41}x_a+a_{44}t_a)\frac{1}{2}(C_x-C_{-x})\right]^2+\frac{(a^2y_a^2+a^2z_a^2)}{C_{-x}C_x}\left[\frac{1}{2}(C_{-x}+C_x)\right]^2$$

$$=(a_{41}x_a+a_{44}t_a)^2\left[\frac{1}{2}(C_{-x}+C_x)\right]^2$$

As $x_a$ and $t_a$ rearranging and collecting terms in the 1st term of the left of the equation above, the equation above will become

$$\left\{x_a\left[a_{11}+a_{41}\frac{1}{2}(C_{-x}-C_x)\right]+t_a\left[-va_{11}+a_{44}\frac{1}{2}(C_{-x}-C_x)\right]\right\}^2$$

$$+\frac{(a^2y_a^2+a^2z_a^2)}{C_{-x}C_x}\left[\frac{1}{2}(C_{-x}+C_x)\right]^2=(a_{41}x_a+a_{44}t_a)^2\left[\frac{1}{2}(C_{-x}+C_x)\right]^2$$

Operation the 1st term of the left of the equation as binomial, the equation above will become

$$x_a^2\left[a_{11}+a_{41}\frac{1}{2}(C_{-x}-C_x)\right]^2+2x_at_a\left[a_{11}+a_{41}\frac{1}{2}(C_{-x}-C_x)\right]\left[-va_{11}+a_{44}\frac{1}{2}(C_{-x}-C_x)\right]$$

$$+t_a^2\left[-va_{11}+a_{44}\frac{1}{2}(C_{-x}-C_x)\right]^2+\frac{(a^2y_a^2+a^2z_a^2)}{C_{-x}C_x}\left[\frac{1}{2}(C_{-x}+C_x)\right]^2$$

$$=(x_a^2a_{41}^2+2x_at_aa_{41}a_{44}+t_a^2a_{44}^2)\left[\frac{1}{2}(C_{-x}+C_x)\right]^2$$

Shift the terms containing $x_a^2$ and $x_at_a$ to the left side, the term containing $t_a^2$ to the right side of the equal sign, the equation above becomes

$$x_a^2\left\{\left[a_{11}+a_{41}\frac{1}{2}(C_{-x}-C_x)\right]^2-a_{41}^2\left[\frac{1}{2}(C_{-x}+C_x)\right]^2\right\}$$

$$+2x_at_a\left\{\left[a_{11}+a_{41}\frac{1}{2}(C_{-x}-C_x)\right]\left[-va_{11}+a_{44}\frac{1}{2}(C_{-x}-C_x)\right]-a_{41}a_{44}\left[\frac{1}{2}(C_{-x}+C_x)\right]^2\right\}$$

$$+\frac{(a^2y_a^2+a^2z_a^2)}{C_{-x}C_x}\left[\frac{1}{2}(C_{-x}+C_x)\right]^2$$

$$=t_a^2\left\{a_{44}^2\left[\frac{1}{2}(C_{-x}+C_x)\right]^2-\left[-va_{11}+a_{44}\frac{1}{2}(C_{-x}-C_x)\right]^2\right\},$$

namely $x_a^2\ (a_{11}+a_{41}C_{-x})(a_{11}-a_{41}C_x)+$

$$2x_at_a\left[a_{11}(-va_{11})+a_{11}a_{44}\frac{1}{2}(C_{-x}-C_x)-va_{11}a_{41}\frac{1}{2}(C_{-x}-C_x)+a_{41}a_{44}(\frac{1}{2})^2(-4C_{-x}C_x)\right]$$

$$+\frac{(a^2y_a^2+a^2z_a^2)}{C_{-x}C_x}\left[\frac{1}{2}(C_{-x}+C_x)\right]^2=t_a^2\ (-va_{11}+a_{44}C_{-x})\ (va_{11}+a_{44}C_x).$$

Above equation's term containing $2x_at_a$ is

$$2x_at_a\left[a_{11}(-va_{11})+a_{11}a_{44}\frac{1}{2}(C_{-x}-C_x)-va_{11}a_{41}\frac{1}{2}(C_{-x}-C_x)+a_{41}a_{44}(\frac{1}{2})^2(-4C_{-x}C_x)\right]$$

$$=2x_at_a\left[a_{11}(-va_{11})+a_{11}a_{44}\frac{1}{2}(C_{-x}-C_x)-va_{11}a_{41}\frac{1}{2}(C_{-x}-C_x)+a_{41}a_{44}(-C_{-x}C_x)\right]$$

$$=2x_at_a\left(\frac{1}{2}\right)[2a_{11}(-va_{11})+a_{11}a_{44}(C_{-x}-C_x)-va_{11}a_{41}(C_{-x}-C_x)+2a_{41}a_{44}(-C_{-x}C_x)]$$

Let $2a_{11}(-va_{11})$ combine with $-va_{11}a_{41}(C_{-x}-C_x)$ and $+a_{11}a_{44}(C_{-x}-C_x)$ combine with $+2a_{41}a_{44}(-C_{-x}C_x)$, namely

$$=2x_at_a\left(\frac{1}{2}\right)[2a_{11}(-va_{11})-va_{11}a_{41}(C_{-x}-C_x)+a_{11}a_{44}(C_{-x}-C_x)+2a_{41}a_{44}(-C_{-x}C_x)]$$

$$=2x_at_a\left(\frac{1}{2}\right)[(-va_{11})(a_{11}+a_{41}C_{-x})+(-va_{11})(a_{11}-a_{41}C_x)$$

$$+a_{44}C_{-x}(a_{11}-a_{41}C_x)-(a_{11}+a_{41}C_{-x})a_{44}C_x]$$

$$=2x_at_a\left(\frac{1}{2}\right)[(-va_{11}+a_{44}C_{-x})(a_{11}-a_{41}C_x)-(a_{11}+a_{41}C_{-x})(a_{44}C_x+va_{11})]$$

$$=2x_at_a\ (a_{11}+a_{41}C_{-x})(a_{11}-a_{41}C_x)\left(\frac{1}{2}\right)\left[\frac{(-va_{11}+a_{44}C_{-x})}{(a_{11}+a_{41}C_{-x})}-\frac{(a_{44}C_x+va_{11})}{(a_{11}-a_{41}C_x)}\right]$$

Taking note of that

$$C_{ax}^{\rightarrow}=\frac{va_{11}+C_xa_{44}}{a_{11}-C_xa_{41}}\ \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(12)$$

$$C_{-ax}^{\rightarrow}=\frac{-va_{11}+C_{-x}a_{44}}{a_{11}+C_{-x}a_{41}}\ \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(14)$$

we obtain

$$2x_at_a\ (a_{11}+a_{41}C_{-x})(a_{11}-a_{41}C_x)\left(\frac{1}{2}\right)\left[\frac{(-va_{11}+a_{44}C_{-x})}{(a_{11}+a_{41}C_{-x})}-\frac{(a_{44}C_x+va_{11})}{(a_{11}-a_{41}C_x)}\right]$$

$$=2x_at_a(a_{11}+a_{41}C_{-x})(a_{11}-a_{41}C_x)\left[\frac{C_{-ax}^{\rightarrow}-C_{ax}^{\rightarrow}}{2}\right]$$

Bring the equation's term containing $2x_a t_a$ above into the original equation we obtain

$$x_a^2\,(a_{11}+a_{41}C_{-x})(a_{11}-a_{41}C_x)+2x_a t_a(a_{11}+a_{41}C_{-x})(a_{11}-a_{41}C_x)\left[\frac{C_{-ax}^{\rightarrow}-C_{ax}^{\rightarrow}}{2}\right]$$

$$+\frac{(a^2y_a^2+a^2z_a^2)}{C_{-x}C_x}\left[\frac{1}{2}(C_{-x}+C_x)\right]^2=t_a^2\,(-va_{11}+a_{44}C_{-x})\,(va_{11}+a_{44}C_x),$$

namely $(a_{11}+a_{41}C_{-x})(a_{11}-a_{41}C_x)\left\{x_a^2+2x_a t_a\left[\frac{C_{-ax}^{\rightarrow}-C_{ax}^{\rightarrow}}{2}\right]\right\}$

$$+\frac{(a^2y_a^2+a^2z_a^2)}{C_{-x}C_x}\left[\frac{1}{2}(C_{-x}+C_x)\right]^2=t_a^2\,(-va_{11}+a_{44}C_{-x})\,(va_{11}+a_{44}C_x),$$

namely $\left\{x_a^2+2x_a t_a\left[\frac{C_{-ax}^{\rightarrow}-C_{ax}^{\rightarrow}}{2}\right]\right\}+\frac{(a^2y_a^2+a^2z_a^2)}{C_{-x}C_x(a_{11}+a_{41}C_{-x})(a_{11}-a_{41}C_x)}\left[\frac{1}{2}(C_{-x}+C_x)\right]^2$

$$=t_a^2\,\frac{(-va_{11}+a_{44}C_{-x})(va_{11}+a_{44}C_x)}{(a_{11}+a_{41}C_{-x})(a_{11}-a_{41}C_x)}=t_a^2\,C_{-ax}^{\rightarrow}C_{ax}^{\rightarrow}$$

namely $\left\{x_a^2+2x_a t_a\left[\frac{C_{-ax}^{\rightarrow}-C_{ax}^{\rightarrow}}{2}\right]\right\}$

$$+\frac{(a^2y_a^2+a^2z_a^2)}{C_{-x}C_x(a_{11}+a_{41}C_{-x})(a_{11}-a_{41}C_x)}\left[\frac{1}{2}(C_{-x}+C_x)\right]^2=t_a^2\,C_{-ax}^{\rightarrow}C_{ax}^{\rightarrow}$$

Added $t_a^2\left[\frac{C_{-ax}^{\rightarrow}-C_{ax}^{\rightarrow}}{2}\right]^2$ at both sides of the equal sign of the equation above, It will combine with the 1st term and the 2nd term of the left of the equation above to found a complete square term, the equation above becomes

$$\left\{x_a^2+2x_a t_a\left[\frac{C_{-x}^{\rightarrow}-C_x^{\rightarrow}}{2}\right]\right\}+t_a^2\left[\frac{C_{-ax}^{\rightarrow}-C_{ax}^{\rightarrow}}{2}\right]^2$$

$$+\frac{(a^2y_a^2+a^2z_a^2)}{C_{-x}C_x(a_{11}+a_{41}C_{-x})(a_{11}-a_{41}C_x)}\left[\frac{1}{2}(C_{-x}+C_x)\right]^2=t_a^2\,C_{-ax}^{\rightarrow}C_{ax}^{\rightarrow}+t_a^2\left[\frac{C_{-ax}^{\rightarrow}-C_{ax}^{\rightarrow}}{2}\right]^2,$$

namely $\left\{x_a+t_a\left[\frac{C_{-ax}^{\rightarrow}-C_{ax}^{\rightarrow}}{2}\right]\right\}^2$

$$+\frac{(a^2y_a^2+a^2z_a^2)}{C_{-x}C_x(a_{11}+a_{41}C_{-x})(a_{11}-a_{41}C_x)}\left[\frac{1}{2}(C_{-x}+C_x)\right]^2=t_a^2\left[\frac{C_{-ax}^{\rightarrow}+C_{ax}^{\rightarrow}}{2}\right]^2.$$

Divided both sides of the equal sign of the equation above with $t_a^2\left[\frac{C_{-ax}^{\rightarrow}+C_{ax}^{\rightarrow}}{2}\right]^2$, the equation above goes to

$$\frac{\left\{x_a+t_a\left[\frac{C_{-ax}^{\rightarrow}-C_{ax}^{\rightarrow}}{2}\right]\right\}^2}{t_a^2\left[\frac{C_{-ax}^{\rightarrow}+C_{ax}^{\rightarrow}}{2}\right]^2}+\frac{(a^2y_a^2+a^2z_a^2)}{t_a^2C_{-x}C_x(a_{11}+a_{41}C_{-x})(a_{11}-a_{41}C_x)}\left[\frac{(C_{-x}+C_x)}{C_{-ax}^{\rightarrow}+C_{ax}^{\rightarrow}}\right]^2=1,$$

namely

$$\frac{\left[x_a-t_a\left(\frac{C_{ax}^{\rightarrow}-C_{-ax}^{\rightarrow}}{2}\right)\right]^2}{\left[t_a\left(\frac{C_{ax}^{\rightarrow}+C_{-ax}^{\rightarrow}}{2}\right)\right]^2}+\frac{(y_a^2+z_a^2)}{t_a^2(a_{11}-C_xa_{41})(a_{11}+C_{-x}a_{41})C_xC_{-x}a^{-2}\left(\frac{C_{ax}^{\rightarrow}+C_{-ax}^{\rightarrow}}{C_x+C_{-x}}\right)^2}=1$$

…………………(24)a

## Shown $a_{41}$ by $a_{11}$, $v$, $C_{-x}$, $C_x$, $C_{-ax}^{\rightarrow}$ and $C_{ax}^{\rightarrow}$, (24)a Goes to (24)

We can solve $a_{44}$ from (12) obtain

$$a_{44}=\frac{1}{C_x}\left[-va_{11}+C_{ax}^{\rightarrow}(a_{11}-C_xa_{41})\right]$$

we can also solve $a_{44}$ from (14) obtain

$$a_{44}=\frac{1}{C_{-x}}\left[va_{11}+C_{-ax}^{\rightarrow}(a_{11}+C_{-x}a_{41})\right]$$

The $a_{44}$ obtained from (12) should be equal to the $a_{44}$ obtained from (14) we get

$$\frac{1}{C_x}\left[-va_{11}+C_{ax}^{\rightarrow}(a_{11}-C_xa_{41})\right]=\frac{1}{C_{-x}}\left[va_{11}+C_{-ax}^{\rightarrow}(a_{11}+C_{-x}a_{41})\right],$$

namely $\frac{1}{C_x}\left[(-v+C_{ax}^{\rightarrow})a_{11}\right]-C_{ax}^{\rightarrow}a_{41}=\frac{1}{C_{-x}}\left[(v+C_{-ax}^{\rightarrow})a_{11}\right]+C_{-ax}^{\rightarrow}a_{41}$.

Shift the terms containing $a_{11}$ to the left side, the term containing $a_{41}$ to the right side of the equal sign, the equation above becomes

$$\left[\frac{1}{C_x}(-v+C_{ax}^{\rightarrow})-\frac{1}{C_{-x}}(v+C_{-ax}^{\rightarrow})\right]a_{11}=a_{41}\,(C_{ax}^{\rightarrow}+C_{-ax}^{\rightarrow})$$

i.e.

$$a_{41}=\frac{a_{11}}{(C_{ax}^{\rightarrow}+C_{-ax}^{\rightarrow})}\left[\frac{1}{C_x}(-v+C_{ax}^{\rightarrow})-\frac{1}{C_{-x}}(v+C_{-ax}^{\rightarrow})\right],$$

therefore $(a_{11}-C_xa_{41})=a_{11}-C_x\frac{a_{11}}{(C_{ax}^{\rightarrow}+C_{-ax}^{\rightarrow})}\left[\frac{1}{C_x}(-v+C_{ax}^{\rightarrow})-\frac{1}{C_{-x}}(v+C_{-ax}^{\rightarrow})\right]$

$$=\frac{a_{11}}{(C_{ax}^{\rightarrow}+C_{-ax}^{\rightarrow})}\left\{(C_{ax}^{\rightarrow}+C_{-ax}^{\rightarrow})-C_x\left[\frac{1}{C_x}(-v+C_{ax}^{\rightarrow})-\frac{1}{C_{-x}}(v+C_{-ax}^{\rightarrow})\right]\right\}$$

$$=\frac{a_{11}}{(C_{ax}^{\to}+C_{-ax}^{\to})}\left\{(C_{ax}^{\to}+C_{-ax}^{\to})-(-v+C_{ax}^{\to})+\left[\frac{C_x}{C_{-x}}(v+C_{-ax}^{\to})\right]\right\}$$

$$=\frac{a_{11}}{(C_{ax}^{\to}+C_{-ax}^{\to})}\left\{C_{-ax}^{\to}+v+\left[\frac{C_x}{C_{-x}}(v+C_{-ax}^{\to})\right]\right\}$$

$$=\frac{a_{11}}{(C_{ax}^{\to}+C_{-ax}^{\to})}\frac{(C_{-x}+C_x)}{C_{-x}}(v+C_{-ax}^{\to})$$

$$=\frac{a_{11}(C_{-x}+C_x)(v+C_{-ax}^{\to})}{C_{-x}(C_{ax}^{\to}+C_{-ax}^{\to})},$$

Analogously $(a_{11}+C_{-x}a_{41})=a_{11}+C_{-x}\dfrac{a_{11}}{(C_{ax}^{\to}+C_{-ax}^{\to})}\left[\dfrac{1}{C_x}(-v+C_{ax}^{\to})-\dfrac{1}{C_{-x}}(v+C_{-ax}^{\to})\right]$

$$=\frac{a_{11}}{(C_{ax}^{\to}+C_{-ax}^{\to})}\left\{(C_{ax}^{\to}+C_{-ax}^{\to})+C_{-x}\left[\frac{1}{C_x}(-v+C_{ax}^{\to})-\frac{1}{C_{-x}}(v+C_{-ax}^{\to})\right]\right\}$$

$$=\frac{a_{11}}{(C_{ax}^{\to}+C_{-ax}^{\to})}\left\{(C_{ax}^{\to}+C_{-ax}^{\to})+C_{-x}\left[\frac{1}{C_x}(-v+C_{ax}^{\to})\right]-(v+C_{-ax}^{\to})\right\}$$

$$=\frac{a_{11}}{(C_{ax}^{\to}+C_{-ax}^{\to})}\frac{(C_x+C_{-x})}{C_x}(-v+C_{ax}^{\to})$$

$$=\frac{a_{11}(C_x+C_{-x})(-v+C_{ax}^{\to})}{C_x(C_{ax}^{\to}+C_{-ax}^{\to})}$$

Bring $(a_{11}-C_xa_{41})$ and $(a_{11}+C_{-x}a_{41})$ above into the 2nd term's coefficient of (24)a leftside

$$\frac{1}{a^{-2}(a_{11}-C_xa_{41})(a_{11}+C_{-x}a_{41})C_xC_{-x}\left(\dfrac{C_{ax}^{\to}+C_{-ax}^{\to}}{C_x+C_{-x}}\right)^2}$$

$$=\frac{1}{(a_{11}-C_xa_{41})}\frac{1}{(a_{11}+C_{-x}a_{41})}\frac{1}{a^{-2}C_xC_{-x}\left(\dfrac{C_{ax}^{\to}+C_{-ax}^{\to}}{C_x+C_{-x}}\right)^2}$$

$$=\frac{C_{-x}(C_{ax}^{\to}+C_{-ax}^{\to})}{a_{11}(C_{-x}+C_x)(v+C_{-ax}^{\to})}\frac{C_x(C_{ax}^{\to}+C_{-ax}^{\to})}{a_{11}(C_x+C_{-x})(-v+C_{ax}^{\to})}\frac{1}{a^{-2}C_xC_{-x}\left(\dfrac{C_{ax}^{\to}+C_{-ax}^{\to}}{C_x+C_{-x}}\right)^2}$$

$$=\frac{1}{\dfrac{a_{11}^2}{a^2}(v+C_{-ax}^{\to})(-v+C_{ax}^{\to})}$$

**Bring (1)b′ and $a_{22} = a_{33} = a$ into (27), (27) will Go to (28)a**

(27) i.e. $$\frac{\left[x_a - t_a\frac{(C_{ax} - C_{-ax})}{2}\right]^2}{\left[t_a\frac{(C_{ax} + C_{-ax})}{2}\right]^2} + \frac{y_a^2 + z_a^2}{t_a^2 C_{ax} C_{-ax}} = 1,$$

rewrite (27) as

$$\left[x_a - t_a\left(\frac{C_{ax} - C_{-ax}}{2}\right)\right]^2 + \frac{(y_a^2 + z_a^2)}{C_{ax}C_{-ax}}\left[\left(\frac{C_{ax} + C_{-ax}}{2}\right)\right]^2 = \left[t_a\left(\frac{C_{ax} + C_{-ax}}{2}\right)\right]^2.$$

Bring (1)b′ and $a_{22} = a_{33} = a$ into (27) above we get

$$\left[\left(\frac{a_{44}}{A}x + \frac{va_{11}}{A}t\right) - \left(\frac{(-a_{41})}{A}x + \frac{a_{11}}{A}t\right)\left(\frac{C_{ax} - C_{-ax}}{2}\right)\right]^2 +$$

$$+\frac{a^{-2}(y^2 + z^2)}{C_{ax}C_{-ax}}\left[\left(\frac{C_{ax} + C_{-ax}}{2}\right)\right]^2 = \left[\left(\frac{(-a_{41})}{A}x + \frac{a_{11}}{A}t\right)\left(\frac{C_{ax} + C_{-ax}}{2}\right)\right]^2$$

rearranging and collecting terms of the 1st square brackets of the equation's left side above we obtain

$$\left\{\left[\frac{a_{44}}{A} + \frac{a_{41}}{A}\left(\frac{C_{ax} - C_{-ax}}{2}\right)\right]x + t\left[\frac{va_{11}}{A} - \frac{a_{11}}{A}\left(\frac{C_{ax} - C_{-ax}}{2}\right)\right]\right\}^2 +$$

$$+\frac{a^{-2}(y^2 + z^2)}{C_{ax}C_{-ax}}\left[\left(\frac{C_{ax} + C_{-ax}}{2}\right)\right]^2 = \left[\left(\frac{(-a_{41})}{A}x + \frac{a_{11}}{A}t\right)\left(\frac{C_{ax} + C_{-ax}}{2}\right)\right]^2$$

Operation the binomials, the equation above will become

$$\left[\frac{a_{44}}{A} + \frac{a_{41}}{A}\left(\frac{C_{ax} - C_{-ax}}{2}\right)\right]^2 x^2 + 2xt\left[\frac{a_{44}}{A} + \frac{a_{41}}{A}\left(\frac{C_{ax} - C_{-ax}}{2}\right)\right]\left[\frac{va_{11}}{A} - \frac{a_{11}}{A}\left(\frac{C_{ax} - C_{-ax}}{2}\right)\right] +$$

$$t^2\left[\frac{va_{11}}{A} - \frac{a_{11}}{A}\left(\frac{C_{ax} - C_{-ax}}{2}\right)\right]^2 + \frac{a^{-2}(y^2 + z^2)}{C_{ax}C_{-ax}}\left[\left(\frac{C_{ax} + C_{-ax}}{2}\right)\right]^2$$

$$= \left[\left(\frac{-a_{41}}{A}\right)^2 x^2 + 2xt\left(\frac{-a_{41}}{A}\right)\left(\frac{a_{11}}{A}\right) + \left(\frac{a_{11}}{A}\right)^2 t^2\right]\left(\frac{C_{ax} + C_{-ax}}{2}\right)^2$$

Shift the terms containing $x^2$ and $xt$ to the left side, the term containing $t^2$ to the right side of the equal sign, the equation above becomes

$$\left[\frac{a_{44}}{A} + \frac{a_{41}}{A}\left(\frac{C_{ax} - C_{-ax}}{2}\right)\right]^2 x^2 + 2xt\left[\frac{a_{44}}{A} + \frac{a_{41}}{A}\left(\frac{C_{ax} - C_{-ax}}{2}\right)\right]\left[\frac{va_{11}}{A} - \frac{a_{11}}{A}\left(\frac{C_{ax} - C_{-ax}}{2}\right)\right]$$

$$-\left[\left(\frac{-a_{41}}{A}\right)^2 x^2 + 2xt\left(\frac{-a_{41}}{A}\right)\left(\frac{a_{11}}{A}\right)\right]\left(\frac{C_{ax} + C_{-ax}}{2}\right)^2 + \frac{a^{-2}(y^2 + z^2)}{C_{ax}C_{-ax}}\left[\left(\frac{C_{ax} + C_{-ax}}{2}\right)\right]^2$$

$$=\left[\left(\frac{a_{11}}{A}\right)^2 t^2\right]\left(\frac{C_{ax}+C_{-ax}}{2}\right)^2-t^2\left[\frac{va_{11}}{A}-\frac{a_{11}}{A}\left(\frac{C_{ax}-C_{-ax}}{2}\right)\right]^2$$

rearranging and collecting terms we obtain

$$\left\{\left[\frac{a_{44}}{A}+\frac{a_{41}}{A}\left(\frac{C_{ax}-C_{-ax}}{2}\right)\right]^2-\left(\frac{a_{41}}{A}\right)^2\left(\frac{C_{ax}+C_{-ax}}{2}\right)^2\right\}x^2+$$

$$2xt\left\{\left[\frac{a_{44}}{A}+\frac{a_{41}}{A}\left(\frac{C_{ax}-C_{-ax}}{2}\right)\right]\left[\frac{va_{11}}{A}-\frac{a_{11}}{A}\left(\frac{C_{ax}-C_{-ax}}{2}\right)\right]+\left[\left(\frac{a_{41}}{A}\right)\left(\frac{a_{11}}{A}\right)\right]\left(\frac{C_{ax}+C_{-ax}}{2}\right)^2\right\}$$

$$+\frac{a^{-2}(y^2+z^2)}{C_{ax}C_{-ax}}\left[\left(\frac{C_{ax}+C_{-ax}}{2}\right)\right]^2$$

$$=\left[\left(\frac{a_{11}}{A}\right)^2 t^2\right]\left(\frac{C_{ax}+C_{-ax}}{2}\right)^2-t^2\left[\frac{va_{11}}{A}-\frac{a_{11}}{A}\left(\frac{C_{ax}-C_{-ax}}{2}\right)\right]^2,$$

namely $\left(\frac{a_{44}}{A}+\frac{a_{41}}{A}C_{ax}\right)\left(\frac{a_{44}}{A}-\frac{a_{41}}{A}C_{-ax}\right)x^2+$

$$2xt\left[\frac{a_{44}}{A}\frac{va_{11}}{A}-\frac{a_{44}}{A}\frac{a_{11}}{A}\left(\frac{C_{ax}-C_{-ax}}{2}\right)+\frac{va_{11}}{A}\frac{a_{41}}{A}\left(\frac{C_{ax}-C_{-ax}}{2}\right)+\left(\frac{a_{41}}{A}\right)\left(\frac{a_{11}}{A}\right)C_{ax}C_{-ax}\right]+$$

$$+\frac{a^{-2}(y^2+z^2)}{C_{ax}C_{-ax}}\left[\left(\frac{C_{ax}+C_{-ax}}{2}\right)\right]^2$$

$$=t^2\left\{\left(\frac{a_{11}}{A}\right)^2\left(\frac{C_{ax}+C_{-ax}}{2}\right)^2-\left[\frac{va_{11}}{A}-\frac{a_{11}}{A}\left(\frac{C_{ax}-C_{-ax}}{2}\right)\right]^2\right\}$$

$$=t^2\left(\frac{va_{11}}{A}+\frac{a_{11}}{A}C_{-ax}\right)\left(\frac{-va_{11}}{A}+\frac{a_{11}}{A}C_{ax}\right)$$

First of all we reduce the term containing $2xt$ as follow

$$2xt\left[\frac{a_{44}}{A}\frac{va_{11}}{A}-\frac{a_{44}}{A}\frac{a_{11}}{A}\left(\frac{C_{ax}-C_{-ax}}{2}\right)+\frac{va_{11}}{A}\frac{a_{41}}{A}\left(\frac{C_{ax}-C_{-ax}}{2}\right)+\left(\frac{a_{41}}{A}\right)\left(\frac{a_{11}}{A}\right)C_{ax}C_{-ax}\right]$$

$$=xt\left[\frac{2a_{44}}{A}\frac{va_{11}}{A}-\frac{a_{44}}{A}\frac{a_{11}}{A}(C_{ax}-C_{-ax})+\frac{va_{11}}{A}\frac{a_{41}}{A}(C_{ax}-C_{-ax})+2\left(\frac{a_{41}}{A}\right)\left(\frac{a_{11}}{A}\right)C_{ax}C_{-ax}\right]$$

$$=xt\left[\frac{2a_{44}}{A}\frac{va_{11}}{A}+\frac{va_{11}}{A}\frac{a_{41}}{A}(C_{ax}-C_{-ax})-\frac{a_{44}}{A}\frac{a_{11}}{A}(C_{ax}-C_{-ax})+2\left(\frac{a_{41}}{A}\right)\left(\frac{a_{11}}{A}\right)C_{ax}C_{-ax}\right]$$

$$=xt\left[(\frac{a_{44}}{A}+\frac{a_{41}}{A}C_{ax})\frac{va_{11}}{A}+(\frac{a_{44}}{A}-C_{-ax}\frac{a_{41}}{A})\frac{va_{11}}{A}\right.$$

$$\left.-(\frac{a_{44}}{A}-\frac{a_{41}}{A}C_{-ax})\frac{a_{11}}{A}C_{ax}+(\frac{a_{41}}{A}C_{ax}+\frac{a_{44}}{A})\frac{a_{11}}{A}C_{-ax}\right]$$

$$= xt\left[ (\frac{a_{44}}{A} + \frac{a_{41}}{A}C_{ax})(\frac{va_{11}}{A} + \frac{a_{11}}{A}C_{-ax}) + (\frac{a_{44}}{A} - \frac{a_{41}}{A}C_{-ax})(\frac{va_{11}}{A} - \frac{a_{11}}{A}C_{ax}) \right]$$

$$= xt\left(\frac{a_{44}}{A} + \frac{a_{41}}{A}C_{ax}\right)\left(\frac{a_{44}}{A} - \frac{a_{41}}{A}C_{-ax}\right)\left[\frac{(\frac{va_{11}}{A} + \frac{a_{11}}{A}C_{-ax})}{\left(\frac{a_{44}}{A} - \frac{a_{41}}{A}C_{-ax}\right)} + \frac{(\frac{va_{11}}{A} - \frac{a_{11}}{A}C_{ax})}{\left(\frac{a_{44}}{A} + \frac{a_{41}}{A}C_{ax}\right)}\right]$$

$$= 2xt\left(\frac{a_{44}}{A} + \frac{a_{41}}{A}C_{ax}\right)\left(\frac{a_{44}}{A} - \frac{a_{41}}{A}C_{-ax}\right)\frac{1}{2}\left[\frac{(va_{11} + a_{11}C_{-ax})}{(a_{44} - a_{41}C_{-ax})} + \frac{(va_{11} - a_{11}C_{ax})}{(a_{44} + a_{41}C_{ax})}\right].$$

Taking note of that

$$-C_x^{\rightarrow} = \frac{(v - C_{ax})a_{11}}{(a_{44} + a_{41}C_{ax})} \text{ ......................(13)}$$

$$C_{-x}^{\rightarrow} = \frac{(v + C_{-ax})a_{11}}{(a_{44} - a_{41}C_{-ax})} \text{ ......................(15)}$$

we obtain

$$2xt\left(\frac{a_{44}}{A} + \frac{a_{41}}{A}C_{ax}\right)\left(\frac{a_{44}}{A} - \frac{a_{41}}{A}C_{-ax}\right)\frac{1}{2}\left[\frac{(va_{11} + a_{11}C_{-ax})}{(a_{44} - a_{41}C_{-ax})} + \frac{(va_{11} - a_{11}C_{ax})}{(a_{44} + a_{41}C_{ax})}\right]$$

$$= 2xt\left(\frac{a_{44}}{A} + \frac{a_{41}}{A}C_{ax}\right)\left(\frac{a_{44}}{A} - \frac{a_{41}}{A}C_{-ax}\right)\left[\frac{C_{-x}^{\rightarrow} - C_x^{\rightarrow}}{2}\right]$$

Bring the equation's term containing $2xt$ above into the original equation we obtain

$$\left(\frac{a_{44}}{A} + \frac{a_{41}}{A}C_{ax}\right)\left(\frac{a_{44}}{A} - \frac{a_{41}}{A}C_{-ax}\right)x^2 +$$

$$+ 2xt\left(\frac{a_{44}}{A} + \frac{a_{41}}{A}C_{ax}\right)\left(\frac{a_{44}}{A} - \frac{a_{41}}{A}C_{-ax}\right)\left[\frac{C_{-x}^{\rightarrow} - C_x^{\rightarrow}}{2}\right] + \frac{a^{-2}(y^2 + z^2)}{C_{ax}C_{-ax}}\left[\left(\frac{C_{ax} + C_{-ax}}{2}\right)\right]^2$$

$$= t^2\left(\frac{va_{11}}{A} + \frac{a_{11}}{A}C_{-ax}\right)\left(\frac{-va_{11}}{A} + \frac{a_{11}}{A}C_{ax}\right)$$

Taking note of that $\left(\frac{a_{44}}{A} + \frac{a_{41}}{A}C_{ax}\right)\left(\frac{a_{44}}{A} - \frac{a_{41}}{A}C_{-ax}\right)$ is the common factor of the terms containing $x^2$ and $2xt$, the equation above can be rewrited as

$$\left(\frac{a_{44}}{A} + \frac{a_{41}}{A}C_{ax}\right)\left(\frac{a_{44}}{A} - \frac{a_{41}}{A}C_{-ax}\right)\left[x^2 + 2xt\left(\frac{C_{-x}^{\rightarrow} - C_x^{\rightarrow}}{2}\right)\right] +$$

$$+ \frac{a^{-2}(y^2 + z^2)}{C_{ax}C_{-ax}}\left[\left(\frac{C_{ax} + C_{-ax}}{2}\right)\right]^2 = t^2\left(\frac{va_{11}}{A} + \frac{a_{11}}{A}C_{-ax}\right)\left(\frac{-va_{11}}{A} + \frac{a_{11}}{A}C_{ax}\right).$$

Divided the equation above with $\left(\frac{a_{44}}{A} + \frac{a_{41}}{A}C_{ax}\right)\left(\frac{a_{44}}{A} - \frac{a_{41}}{A}C_{-ax}\right)$, we get

$$\left[x^2+2xt\left(\frac{C_{-x}^{\rightarrow}-C_x^{\rightarrow}}{2}\right)\right]+\frac{a^{-2}(y^2+z^2)}{\left(\frac{a_{44}}{A}+\frac{a_{41}}{A}C_{ax}\right)\left(\frac{a_{44}}{A}-\frac{a_{41}}{A}C_{-ax}\right)C_{ax}C_{-ax}}\left[\left(\frac{C_{ax}+C_{-ax}}{2}\right)\right]^2$$

$$=t^2\frac{\left(\frac{va_{11}}{A}+\frac{a_{11}}{A}C_{-ax}\right)\left(\frac{-va_{11}}{A}+\frac{a_{11}}{A}C_{ax}\right)}{\left(\frac{a_{44}}{A}+\frac{a_{41}}{A}C_{ax}\right)\left(\frac{a_{44}}{A}-\frac{a_{41}}{A}C_{-ax}\right)},$$

namely $\left[x^2+2xt\left(\frac{C_{-x}^{\rightarrow}-C_x^{\rightarrow}}{2}\right)\right]+\frac{A^2a^{-2}(y^2+z^2)}{(a_{44}+a_{41}C_{ax})(a_{44}-a_{41}C_{-ax})C_{ax}C_{-ax}}\left[\left(\frac{C_{ax}+C_{-ax}}{2}\right)\right]^2$

$=t^2C_x^{\rightarrow}C_{-x}^{\rightarrow}$.

Added $t^2\left(\frac{C_{-x}^{\rightarrow}-C_x^{\rightarrow}}{2}\right)^2$ at both sides of the equal sign of the equation above, It will combine with the 1st term and 2nd term of the equal sign left to found a complete square term, the equation above becomes

$$\left[x+t\left(\frac{C_{-x}^{\rightarrow}-C_x^{\rightarrow}}{2}\right)\right]^2+\frac{A^2a^{-2}(y^2+z^2)}{(a_{44}+a_{41}C_{ax})(a_{44}-a_{41}C_{-ax})C_{ax}C_{-ax}}\left[\left(\frac{C_{ax}+C_{-ax}}{2}\right)\right]^2$$

$$=t^2C_x^{\rightarrow}C_{-x}^{\rightarrow}+t^2\left(\frac{C_{-x}^{\rightarrow}-C_x^{\rightarrow}}{2}\right)^2$$

$$=t^2\left(\frac{C_{-x}^{\rightarrow}+C_x^{\rightarrow}}{2}\right)^2$$

Divided the equation above with $t^2\left(\frac{C_{-x}^{\rightarrow}+C_x^{\rightarrow}}{2}\right)^2$, the equation above goes to

$$\frac{\left[x-t\left(\frac{C_x^{\rightarrow}-C_{-x}^{\rightarrow}}{2}\right)\right]^2}{\left[t\left(\frac{C_{-x}^{\rightarrow}+C_x^{\rightarrow}}{2}\right)\right]^2}+\frac{A^2a^{-2}(y^2+z^2)}{t^2(a_{44}+a_{41}C_{ax})(a_{44}-a_{41}C_{-ax})C_{ax}C_{-ax}}\left[\left(\frac{C_{ax}+C_{-ax}}{C_{-x}^{\rightarrow}+C_x^{\rightarrow}}\right)\right]^2=1,$$

namely $\frac{\left[x-t\left(\frac{C_x^{\rightarrow}-C_{-x}^{\rightarrow}}{2}\right)\right]^2}{\left[t\left(\frac{C_{-x}^{\rightarrow}+C_x^{\rightarrow}}{2}\right)\right]^2}+\frac{(y^2+z^2)}{t^2A^{-2}a^2(a_{44}+a_{41}C_{ax})(a_{44}-a_{41}C_{-ax})C_{ax}C_{-ax}\left(\frac{C_{-x}^{\rightarrow}+C_x^{\rightarrow}}{C_{ax}+C_{-ax}}\right)^2}=1$

………………(28)a

**Shown** $C_{ax}C_{-ax}\left(\frac{C_{x}^{\rightarrow}+C_{-x}^{\rightarrow}}{C_{ax}+C_{-ax}}\right)^{2}$ **by** $a_{ij}$**,** $v$**,** $C_{-x}^{\rightarrow}$ **and** $C_{x}^{\rightarrow}$ **, (28)a will go to (28)**

From (13) i.e. $C_{x}^{\rightarrow}=\frac{(C_{ax}-v)a_{11}}{(a_{44}+a_{41}C_{ax})}$, rewrite (13) as $(a_{44}+a_{41}C_{ax})C_{x}^{\rightarrow}=a_{11}C_{ax}-va_{11}$. We can get $C_{ax}$ from the equation: $C_{ax}=\frac{a_{44}C_{x}^{\rightarrow}+va_{11}}{(a_{11}-a_{41}C_{x}^{\rightarrow})}$.

Analogously from (15), $C_{-x}^{\rightarrow}=\frac{(v+C_{-ax})a_{11}}{(a_{44}-a_{41}C_{-ax})}$, i.e. $(a_{44}-a_{41}C_{-ax})C_{-x}^{\rightarrow}=(v+C_{-ax})a_{11}$, we can get $C_{-ax}$ = $\frac{a_{44}C_{-x}^{\rightarrow}-va_{11}}{(a_{41}C_{-x}^{\rightarrow}+a_{11})}$.

From $C_{ax}$ plus $C_{-ax}$ we get

$$C_{ax}+C_{-ax}=\frac{a_{44}C_{x}^{\rightarrow}+va_{11}}{(a_{11}-a_{41}C_{x}^{\rightarrow})}+\frac{a_{44}C_{-x}^{\rightarrow}-va_{11}}{(a_{41}C_{-x}^{\rightarrow}+a_{11})}$$

$$=\frac{(a_{44}C_{x}^{\rightarrow}+va_{11})(a_{41}C_{-x}^{\rightarrow}+a_{11})}{(a_{11}-a_{41}C_{x}^{\rightarrow})(a_{41}C_{-x}^{\rightarrow}+a_{11})}+\frac{(a_{44}C_{-x}^{\rightarrow}-va_{11})(a_{11}-a_{41}C_{x}^{\rightarrow})}{(a_{11}-a_{41}C_{x}^{\rightarrow})(a_{41}C_{-x}^{\rightarrow}+a_{11})}$$

$$=\frac{a_{44}a_{41}C_{-x}^{\rightarrow}C_{x}^{\rightarrow}+a_{11}a_{44}C_{x}^{\rightarrow}+va_{11}a_{41}C_{-x}^{\rightarrow}+va_{11}^{2}}{(a_{11}-a_{41}C_{x}^{\rightarrow})(a_{41}C_{-x}^{\rightarrow}+a_{11})}$$

$$+\frac{a_{11}a_{44}C_{-x}^{\rightarrow}-a_{44}a_{41}C_{x}^{\rightarrow}C_{-x}^{\rightarrow}-va_{11}^{2}+va_{11}a_{41}C_{x}^{\rightarrow}}{(a_{11}-a_{41}C_{x}^{\rightarrow})(a_{41}C_{-x}^{\rightarrow}+a_{11})}$$

$$=\frac{a_{11}a_{44}C_{x}^{\rightarrow}+va_{11}a_{41}C_{-x}^{\rightarrow}+a_{11}a_{44}C_{-x}^{\rightarrow}+va_{11}a_{41}C_{x}^{\rightarrow}}{(a_{11}-a_{41}C_{x}^{\rightarrow})(a_{41}C_{-x}^{\rightarrow}+a_{11})}$$

$$=\frac{a_{11}(C_{-x}^{\rightarrow}+C_{x}^{\rightarrow})(a_{44}+va_{41})}{(a_{11}-a_{41}C_{x}^{\rightarrow})(a_{41}C_{-x}^{\rightarrow}+a_{11})},$$

therefore $\frac{(C_{-x}^{\rightarrow}+C_{x}^{\rightarrow})}{(C_{-ax}+C_{ax})}=\frac{(a_{11}+a_{41}C_{-x}^{\rightarrow})(a_{11}-a_{41}C_{x}^{\rightarrow})}{a_{11}(a_{44}+va_{41})}$

From $C_{ax}$ multiply $C_{-ax}$ we get

$$C_{ax}C_{-ax}=\frac{(a_{44}C_{x}^{\rightarrow}+va_{11})}{(a_{11}-a_{41}C_{x}^{\rightarrow})}\frac{(a_{44}C_{-x}^{\rightarrow}-va_{11})}{(a_{41}C_{-x}^{\rightarrow}+a_{11})},$$

Therefore $C_{ax}C_{-ax}\left(\frac{C_{-x}^{\rightarrow}+C_{x}^{\rightarrow}}{C_{ax}+C_{-ax}}\right)^{2}$ =

$$\frac{(a_{44}C_{x}^{\rightarrow}+va_{11})}{(a_{11}-a_{41}C_{x}^{\rightarrow})}\frac{(a_{44}C_{-x}^{\rightarrow}-va_{11})}{(a_{41}C_{-x}^{\rightarrow}+a_{11})}\left[\frac{(a_{11}+a_{41}C_{-x}^{\rightarrow})(a_{11}-a_{41}C_{x}^{\rightarrow})}{a_{11}(a_{44}+va_{41})}\right]^{2}$$

$$= (a_{44}C_x^{\to} + va_{11})(a_{44}C_{-x}^{\to} - va_{11})\left[\frac{(a_{11}+a_{41}C_{-x}^{\to})(a_{11}-a_{41}C_x^{\to})}{a_{11}^2(a_{44}+va_{41})^2}\right]$$

$$= a_{44}^2(C_x^{\to} + v\frac{a_{11}}{a_{44}})(C_{-x}^{\to} - v\frac{a_{11}}{a_{44}})\frac{(a_{11}+a_{41}C_{-x}^{\to})(a_{11}-a_{41}C_x^{\to})}{a_{11}^2(a_{44}+va_{41})^2}.$$

Bring the result of the $C_{ax}C_{-ax}\left(\frac{C_{-x}^{\to}+C_x^{\to}}{C_{ax}+C_{-ax}}\right)^2$ above into the 2nd term of (28)a leftside, the 2nd term of (28)a leftside will becom

$$\frac{(y^2+z^2)}{t^2A^{-2}a^2(a_{44}+a_{41}C_{ax})(a_{44}-a_{41}C_{-ax})C_{ax}C_{-ax}\left(\frac{C_{-x}^{\to}+C_x^{\to}}{C_{ax}+C_{-ax}}\right)^2} =$$

$$\frac{(y^2+z^2)}{t^2\frac{(a_{44}+a_{41}C_{ax})(a_{44}-a_{41}C_{-ax})(a_{11}+a_{41}C_{-x}^{\to})(a_{11}-a_{41}C_x^{\to})}{A^2a^{-2}a_{44}^{-2}a_{11}^2(a_{44}+va_{41})^2}(C_x^{\to}+v\frac{a_{11}}{a_{44}})(C_{-x}^{\to}-v\frac{a_{11}}{a_{44}})}$$

Taking note of that $A = a_{11}(a_{44}+va_{41})$, the 2nd term of (28)a leftside will become

$$\frac{(y^2+z^2)}{t^2\frac{(a_{44}+a_{41}C_{ax})(a_{44}-a_{41}C_{-ax})(a_{11}+a_{41}C_{-x}^{\to})(a_{11}-a_{41}C_x^{\to})}{a^{-2}a_{44}^{-2}a_{11}^4(a_{44}+va_{41})^4}(C_x^{\to}+v\frac{a_{11}}{a_{44}})(C_{-x}^{\to}-v\frac{a_{11}}{a_{44}})}$$

When it is placed into (28)a, (28)a goes to (28).

## Solve the Equation (29) obtain $a_{41} = \frac{a_{44}}{v}(\frac{a}{a_{11}}-1)$

(29) i.e. $\frac{(a_{44}+a_{41}C_{ax})(a_{44}-a_{41}C_{-ax})(a_{11}+a_{41}C_{-x}^{\to})(a_{11}-a_{41}C_x^{\to})}{a_{44}^{-2}a^{-2}a_{11}^4(a_{44}+va_{41})^4} = 1$,

i.e. $(a_{44}+a_{41}C_{ax})(a_{44}-a_{41}C_{-ax})(a_{11}+a_{41}C_{-x}^{\to})(a_{11}-a_{41}C_x^{\to}) = a_{44}^{-2}a^{-2}a_{11}^4(a_{44}+va_{41})^4$

Setting $f = \frac{a_{41}}{a_{11}}$ and $\varphi = \frac{a_{44}}{a_{11}}$, divided both sides of the equal sign of the equation with $a_{11}^4$, the equation above becomes

$$(\varphi+C_{ax}f)(\varphi-C_{-ax}f)(1+C_{-x}^{\to}f)(1-C_x^{\to}f) = a_{44}^{-2}a^{-2}a_{11}^4(\varphi+vf)^4.$$

Bring (13) and (15) i.e. $C_x^{\to} = \frac{(C_{ax}-v)a_{11}}{(a_{44}+C_{ax}a_{41})} = \frac{(C_{ax}-v)}{(\varphi+C_{ax}f)}$ and $C_{-x}^{\to} = \frac{(v+C_{-ax})a_{11}}{(a_{44}-C_{-ax}a_{41})} = \frac{(v+C_{-ax})}{(\varphi-C_{-ax}f)}$ into the equation above, the equation above becomes

$$(\varphi+C_{ax}f)(\varphi-C_{-ax}f)\left[1+\frac{(v+C_{-ax})f}{(\varphi-C_{-ax}f)}\right]\left[1-\frac{(C_{ax}-v)f}{(\varphi+C_{ax}f)}\right] = a_{44}^{-2}a^{-2}a_{11}^4(\varphi+vf)^4$$

namely

$$(\varphi+C_{ax}f)(\varphi-C_{-ax}f)\left[\frac{\varphi-C_{-ax}f+(v+C_{-ax})f}{(\varphi-C_{-ax}f)}\right]\left[\frac{\varphi+C_{ax}f-(C_{ax}-v)f}{(\varphi+C_{ax}f)}\right] = a_{44}^{-2}a^{-2}a_{11}^4(\varphi+vf)^4$$

namely $(\varphi + C_{ax} f)(\varphi - C_{-ax} f)\left[\frac{\varphi + vf}{(\varphi - C_{-ax} f)}\right]\left[\frac{\varphi + vf}{(\varphi + C_{ax} f)}\right] = a_{44}^{-2} a^{-2} a_{11}^{4} (\varphi + vf)^4$,

namely $(\varphi + vf)^2 = a_{44}^{-2} a^{-2} a_{11}^{4} (\varphi + vf)^4$,

namely $\frac{a_{44}^2 a^2}{a_{11}^4}(\varphi + vf)^2 = (\varphi + vf)^4$

namely $0 = \left[(\varphi + vf)^2 - \frac{a_{44}^2 a^2}{a_{11}^4}\right](\varphi + fv)^2$.

Therefore, it must be : $(\varphi + vf)^2 = 0$, or $\left[(\varphi + vf) - \frac{a_{44} a}{a_{11}^2}\right]\left[(\varphi + vf) + \frac{a_{44} a}{a_{11}^2}\right] = 0$.

From (11), $m = \frac{m_0}{a_{44}(u) + u a_{41}(u)}$ :

①If $(\varphi + vf)^2 = 0$, namely $(\frac{a_{44} + v a_{41}}{a_{11}})^2 = 0$, namely $(a_{44} + v a_{41}) = 0$, namely [ $a_{44}(v) + v a_{41}(v)$ ]=0, therefore

$m\big|_{u=v} = \frac{m_0}{a_{44}(u) + u a_{41}(u)}\bigg|_{u=v} = \frac{m_0}{a_{44} + v a_{41}} = \frac{m_0}{0}$. It obviously is wrong.

②If $\left[(\varphi + vf) + \frac{a_{44} a}{a_{11}^2}\right] = 0$ , i.e. $(\varphi + vf) = -\frac{a_{44} a}{a_{11}^2}$ i.e. $(a_{44} + v a_{41}) = -\frac{a_{44} a}{a_{11}}$ , therefore

$m\big|_{u=v} = \frac{m_0}{a_{44}(u) + u a_{41}(u)}\bigg|_{u=v} = \frac{m_0}{a_{44} + v a_{41}} = \frac{-m_0 a_{11}}{a_{44} a}$ is negative. It also is obviously wrong.

③If $\left[(\varphi + vf) - \frac{a_{44} a}{a_{11}^2}\right] = 0$, i.e. $(\varphi + vf) = \frac{a_{44} a}{a_{11}^2}$, i.e. $(a_{44} + v a_{41}) = \frac{a_{44} a}{a_{11}}$, therefore $m\big|_{u=v} = \frac{m_0}{a_{44}(u) + u a_{41}(u)}\bigg|_{u=v} =$ $\frac{m_0}{a_{44} + v a_{41}} = \frac{m_0 a_{11}}{a_{44} a}$. This result is passable. So, we abnegate the roots of $(\varphi + vf)^2 = 0$ and $\left[(\varphi + vf) + \frac{a_{44} a}{a_{11}^2}\right] = 0$, adopt the result of $(\varphi + vf) = \frac{a_{44} a}{a_{11}^2}$ i.e. $\frac{a_{44}}{a_{11}} + \frac{v a_{41}}{a_{11}} = \frac{a_{44} a}{a_{11}^2}$ get $a_{41} = \frac{a_{44}}{v}(\frac{a}{a_{11}} - 1)$.

## When $2c_a = t_a(C_{ax} - C_{-ax})$, $2c_a^{\rightarrow} = t_a[(C_{-ax}^{\rightarrow} + v) - (C_{ax}^{\rightarrow} - v)]$, (12), (14) and $M = M_0/(a_{44} + v a_{41})$ being Placed in $2c_a/(2c_a^{\rightarrow}) = M/M_{a0}$ under (1)d We Get (30)′:

Bring $2c_a = t_a(C_{ax} - C_{-ax})$ and $2c_a^{\rightarrow} = t_a[(C_{-ax}^{\rightarrow} + v) - (C_{ax}^{\rightarrow} - v)]$ into $2c_a/(2c_a^{\rightarrow}) = M/M_{a0}$ get $\frac{t_a(C_{ax} - C_{-ax})}{t_a[(C_{-ax}^{\rightarrow} + v) - (C_{ax}^{\rightarrow} - v)]} =$ $\frac{M_0}{M_{a0}(a_{44} + v a_{41})}$ i.e. $\frac{(C_{ax} - C_{-ax})}{[(C_{-ax}^{\rightarrow} + v) - (C_{ax}^{\rightarrow} - v)]} = \frac{M_0}{M_{a0}(a_{44} + v a_{41})}$. When (12) and (14) being placed it goes to

$$\frac{(C_{ax}-C_{-ax})}{\left(\frac{-va_{11}+C_{-x}a_{44}}{a_{11}+C_{-x}a_{41}}+v\right)-\left(\frac{va_{11}+C_{x}a_{44}}{a_{11}-C_{x}a_{41}}-v\right)}=\frac{M_0}{M_{a0}(a_{44}+va_{41})}$$

Please note under (1)d there must be $a_{41}=0$ it can be reduced into

$$\frac{(C_{ax}-C_{-ax})a_{11}}{(C_{-x}-C_{x})}=\frac{M_0}{M_{a0}} \text{ ................}(30)'$$

**Find out $C'_{-ax}\big|_{v=0}$, $C'_{ax}\big|_{v=0}$, $C'_{-x}\big|_{v=0}$, $C'_{x}\big|_{v=0}$, $\varphi_3'/_{v=0}$, $\varphi_3''/_{v=0}$, $\varphi_3'''/_{v=0}$ etc with Simultaneous Equations (26), (19), $f_3=0$, (30) and $\varphi_3$**

Please note $f_3=0$ then $\varphi_3$ can be reduced to $\varphi_3=\dfrac{\dfrac{C_{-ax}C_{-x}}{C_x}+\dfrac{C_{ax}C_x}{C_{-x}}+v\left(\dfrac{C_{ax}C_x}{C_{-ax}C_{-x}}-\dfrac{C_{-ax}C_{-x}}{C_{ax}C_x}\right)}{\dfrac{C_{-ax}C_{-x}}{C_{ax}}+\dfrac{C_{ax}C_x}{C_{-ax}}}$.

We set $f=\dfrac{a_{41}}{a_{11}}$, $\varphi=\dfrac{a_{44}}{a_{11}}$, $a=C_{-ax}$, $b=C_{ax}$, $c=C_{-x}$ and $d=C_x$, denote $\dfrac{d\varphi_3}{dv}$ by $\varphi_3'$, $\dfrac{d^2\varphi_3}{dv^2}$ by $\varphi_3''$, $\dfrac{d^3\varphi_3}{dv^3}$ by $\varphi_3'''$, $\dfrac{da}{dv}$ by $a'$, $\dfrac{d^2a}{dv^2}$ by $a''$ and $\dfrac{d^3a}{dv^3}$ by $a'''$ etc.

Of course when $v=0$ it must be $a=b=c=d=C$ anywhere except the two infinitely small regions each contains the $\Sigma$'s origin and the $\Sigma_a$'s origin, and $\varphi_3=\dfrac{\dfrac{C^2}{C}+\dfrac{C^2}{C}+0}{\dfrac{C^2}{C}+\dfrac{C^2}{C}}=1.$

From (26) i.e. $\dfrac{1}{a}+\dfrac{1}{b}=\dfrac{2}{C}$ derivation we obtain

$$1①: -\frac{a'}{a^2}-\frac{b'}{b^2}=0 \text{ ..............} \frac{d}{dv}(26)$$

$$1②: -\frac{a''}{a^2}+2\frac{a'^2}{a^3}-\frac{b''}{b^2}+2\frac{b'^2}{b^3}=0 \text{ ..............} \frac{d^2}{dv^2}(26)$$

$$1③: -\frac{a'''}{a^2}+6\frac{a'a''}{a^3}-6\frac{a'^3}{a^4}-\frac{b'''}{b^2}+6\frac{b''b'}{b^3}-6\frac{b'^3}{b^4}=0 \text{ ..............} \frac{d^3}{dv^3}(26)$$

$$1④: -\frac{a''''}{a^2}+2\frac{a'a'''}{a^3}+6\frac{a''^2}{a^3}+6\frac{a'a'''}{a^3}-18\frac{a'^2a''}{a^4}-18\frac{a'^2a''}{a^4}+24\frac{a'^4}{a^5}-\frac{b''''}{b^2}+2\frac{b'b'''}{b^3}$$

$$+6\frac{b'''b'}{b^3}+6\frac{b''^2}{b^3}-18\frac{b''b'^2}{b^4}-18\frac{b'^2b''}{b^4}+24\frac{b'^4}{b^5}=0 \text{ ..............} \frac{d^4}{dv^4}(26)$$

i.e.

$$-\frac{a''''}{a^2}+6\frac{a''^2}{a^3}+8\frac{a'a'''}{a^3}-36\frac{a'^2a''}{a^4}+24\frac{a'^4}{a^5}-\frac{b''''}{b^2}+8\frac{b'b'''}{b^3}+6\frac{b''^2}{b^3}-36\frac{b'^2b''}{b^4}+24\frac{b'^4}{b^5}=0$$

1⑤:

$$-\frac{a'''''}{a^2}+2\frac{a'a''''}{a^3}+12\frac{a''a'''}{a^3}-18\frac{a'a''^2}{a^3}+8\frac{a''a'''}{a^3}+8\frac{a'a''''}{a^3}-24\frac{a'^2a'''}{a^4}$$

$$-36\cdot 2\frac{a'a''^2}{a^4}-36\frac{a'^2a'''}{a^4}+36\cdot 4\frac{a'^3a''}{a^5}+24\cdot 4\frac{a'^3a''}{a^5}-24\cdot 5\frac{a'^5}{a^6}$$

$$-\frac{b'''''}{b^2}+2\frac{b'b''''}{b^3}+8\frac{b''b'''}{b^3}+8\frac{b'b''''}{b^3}-24\frac{b'^2b'''}{b^4}+12\frac{b''b'''}{b^3}-18\frac{b'b''^2}{b^4}$$

$$-36\cdot 2\frac{b'b''^2}{b^4}-36\frac{b'^2b'''}{b^4}+36\cdot 4\frac{b'^3b''}{b^5}+24\cdot 4\frac{b'^3b''}{b^5}-24\cdot 5\frac{b'^5}{b^6}=0$$

$$\ldots\ldots\ldots\ldots\ldots\frac{d^5}{dv^5} \quad (26)$$

i.e. 1⑤:

$$\frac{a'''''}{a^2}+\frac{b'''''}{b^2}=+10\frac{a'a''''}{a^3}+20\frac{a''a'''}{a^3}-45\cdot 2\frac{a'a''^2}{a^4}-60\frac{a'^2a'''}{a^4}+60\cdot 4\frac{a'^3a''}{a^5}-24\cdot 5\frac{a'^5}{a^6}$$

$$+10\frac{b'b''''}{b^3}+20\frac{b''b'''}{b^3}-45\cdot 2\frac{b'b''^2}{b^4}-60\frac{b'^2b'''}{b^4}+60\cdot 4\frac{b'^3b''}{b^5}-24\cdot 5\frac{b'^5}{b^6}$$

1⑥:

$$\frac{a''''''}{a^2}-2\frac{a'a'''''}{a^3}+\frac{b''''''}{b^2}-2\frac{b'b'''''}{b^3}=+10\frac{a''a''''}{a^3}+10\frac{a'a'''''}{a^3}-30\frac{a'^2a''''}{a^4}+20\frac{a'''a'''}{a^3}+20\frac{a''a''''}{a^3}$$

$$-60\frac{a'a''a'''}{a^4}-45\cdot 2\frac{a''a''^2}{a^4}-45\cdot 4\frac{a'a''a'''}{a^4}+45\cdot 8\frac{a'^2a''^2}{a^5}-120\frac{a'a''a'''}{a^4}-60\frac{a'^2a''''}{a^4}$$

$$+4\cdot 60\frac{a'^3a'''}{a^5}+60\cdot 4\cdot 3\frac{a'^2a''^2}{a^5}+60\cdot 4\frac{a'^3a'''}{a^5}-60\cdot 5\cdot 4\frac{a'^4a''}{a^6}-24\cdot 25\frac{a'^4a''}{a^6}+24\cdot 6\cdot 5\frac{a'^6}{a^7}$$

$$+10\frac{b''b''''}{b^3}+10\frac{b'b'''''}{b^3}-30\frac{b'^2b''''}{b^4}+20\frac{b'''^2}{b^3}+20\frac{b''b''''}{b^3}-60\frac{b'b''b'''}{b^4}$$

$$-45\cdot 2\frac{b''^3}{b^4}-45\cdot 4\frac{b'b''b'''}{b^4}+45\cdot 8\frac{b'^2b''^2}{b^5}-120\frac{b'b''b'''}{b^4}-60\frac{b'^2b''''}{b^4}+60\cdot 4\frac{b'^3b'''}{b^5}$$

$$+60\cdot 4\cdot 3\frac{b'^2b''^2}{b^5}+60\cdot 4\frac{b'^3b'''}{b^5}-60\cdot 5\cdot 4\frac{b'^4b''}{b^6}-24\cdot 25\frac{b'^4b''}{b^6}+24\cdot 6\cdot 5\frac{b'^6}{b^7}$$

i.e. 1⑥:

$$\frac{a''''''}{a^2}+\frac{b''''''}{b^2}=12\frac{a'a'''''}{a^3}+30\frac{a''a''''}{a^3}-90\frac{a'^2a''''}{a^4}+20\frac{a'''^2}{a^3}+60\cdot 8\frac{a'^3a'''}{a^5}-9\cdot 10\cdot 4\frac{a'a''a'''}{a^4}$$

$$-45\cdot 2\frac{a''^3}{a^4}+45\cdot 24\frac{a'^2a''^2}{a^5}-60\cdot 5\cdot 6\frac{a'^4a''}{a^6}+24\cdot 6\cdot 5\frac{a'^6}{a^7}$$

$$12\frac{b'b'''''}{b^3}+30\frac{b''b''''}{b^3}-90\frac{b'^2b''''}{b^4}+20\frac{b'''^2}{b^3}+60\cdot 8\frac{b'^3b'''}{b^5}-9\cdot 10\cdot 4\frac{b'b''b'''}{b^4}$$

$$-45\cdot 2\frac{b''^3}{b^4}+45\cdot 24\frac{b'^2b''^2}{b^5}-60\cdot 5\cdot 6\frac{b'^4b''}{b^6}+24\cdot 6\cdot 5\frac{b'^6}{b^7}$$

$$\ldots\ldots\ldots\ldots\ldots \frac{d^6}{dv^6} (26)$$

From (19) (i.e. $\frac{1}{c}+\frac{1}{d}=\frac{2}{C}$ ) derivation, we obtain

$$2①: -\frac{c'}{c^2}-\frac{d'}{d^2}=0 \ldots\ldots\ldots\ldots\ldots \frac{d}{dv} (19)$$

$$2②: -\frac{c''}{c^2}+2\frac{c'^2}{c^3}-\frac{d''}{d^2}+2\frac{d'^2}{d^3}=0 \ldots\ldots\ldots\ldots\ldots \frac{d^2}{dv^2} (19)$$

$$2③: -\frac{c'''}{c^2}+6\frac{c'c''}{c^3}-6\frac{c'^3}{c^4}-\frac{d'''}{d^2}+6\frac{d''d'}{d^3}-6\frac{d'^3}{d^4}=0 \ldots\ldots\ldots\ldots\ldots \frac{d^3}{dv^3} (19)$$

$$2④: -\frac{c''''}{c^2}+2\frac{c'c'''}{c^3}+6\frac{c''^2}{c^3}+6\frac{c'c'''}{c^3}-18\frac{c'^2c''}{c^4}-18\frac{c'^2c''}{c^4}+24\frac{c'^4}{c^5}-\frac{d''''}{d^2}+2\frac{d'd'''}{d^3}$$

$$+6\frac{d'''d'}{d^3}+6\frac{d''^2}{d^3}-18\frac{d''d'^2}{d^4}-18\frac{d'^2d''}{d^4}+24\frac{d'^4}{d^5}=0 \ldots\ldots\ldots\ldots\ldots \frac{d^4}{dv^4} (19)$$

i.e.

$$-\frac{c''''}{c^2}+6\frac{c''^2}{c^3}+8\frac{c'c'''}{c^3}-36\frac{c'^2c''}{c^4}+24\frac{c'^4}{c^5}-\frac{d''''}{d^2}+8\frac{d'''d'}{d^3}+6\frac{d''^2}{d^3}-36\frac{d'^2d''}{d^4}+24\frac{d'^4}{d^5}=0$$

2⑤:

$$-\frac{c'''''}{c^2}+2\frac{c'c''''}{c^3}+12\frac{c''c'''}{c^3}-18\frac{c'c''^2}{c^4}+8\frac{c''c'''}{c^3}+8\frac{c'c''''}{c^3}-24\frac{c'^2c'''}{c^4}$$

$$-36\cdot 2\frac{c'c''^2}{c^4}-36\frac{c'^2c'''}{c^4}+36\cdot 4\frac{c'^3c''}{c^5}+24\cdot 4\frac{c'^3c''}{c^5}-24\cdot 5\frac{c'^5}{c^6}-\frac{d'''''}{d^2}+2\frac{d'd''''}{d^3}$$

$$+8\frac{d''''d'}{d^3}+8\frac{d'''d''}{d^3}-24\frac{d'''d'^2}{d^4}+12\frac{d''d'''}{d^3}-18\frac{d'd''^2}{d^4}$$

$$-36\cdot 2\frac{d'd''^2}{d^4}-36\frac{d'^2d'''}{d^4}+36\cdot 4\frac{d'^3d''}{d^5}+24\cdot 4\frac{d'^3d''}{d^5}-24\cdot 5\frac{d'^5}{d^6}=0$$

i.e. 2⑤:

$$\frac{c'''''}{c^2}+\frac{d'''''}{d^2}=+10\frac{c'c''''}{c^3}+20\frac{c''c'''}{c^3}-60\frac{c'^2c'''}{c^4}-45\cdot 2\frac{c'c''^2}{c^4}+60\cdot 4\frac{c'^3c''}{c^5}-24\cdot 5\frac{c'^5}{c^6}$$

$$+10\frac{d'd''''}{d^3}+20\frac{d'''d''}{d^3}-60\frac{d'''d'^2}{d^4}-45\cdot 2\frac{d'd''^2}{d^4}+60\cdot 4\frac{d'^3d''}{d^5}-24\cdot 5\frac{d'^5}{d^6}$$

$$\ldots\ldots\ldots\ldots\ldots \frac{d^5}{dv^5} (19)$$

2⑥:

$$\frac{c''''''}{c^2}-2\frac{c'c'''''}{c^3}+\frac{d''''''}{d^2}-2\frac{d'd'''''}{d^3}=+10\frac{c''c''''}{c^3}+10\frac{c'c'''''}{c^3}-30\frac{c'^2c''''}{c^4}+20\frac{c'''^2}{c^3}+20\frac{c''c''''}{c^3}$$

$$-60\frac{c'c''c'''}{c^4}-120\frac{c'c''c'''}{c^4}-60\frac{c'^2c''''}{c^4}+60\cdot 4\frac{c'^3c'''}{c^5}-45\cdot 2\frac{c''^3}{c^4}-45\cdot 4\frac{c'c''c'''}{c^4}+45\cdot 8\frac{c'^2c''^2}{c^5}$$

$$+60\cdot 12\frac{c'^2c''^2}{c^5}+60\cdot 4\frac{c'^3c'''}{c^5}-60\cdot 5\cdot 4\frac{c'^4c''}{c^6}-24\cdot 25\frac{c'^4c''}{c^6}+24\cdot 30\frac{c'^6}{c^7}$$

$$+10\frac{d''d''''}{d^3}+10\frac{d'd'''''}{d^3}-30\frac{d'^2d''''}{d^4}+20\frac{d''''d''}{d^3}+20\frac{d'''^2}{d^3}-60\frac{d'''d''d'}{d^4}-60\frac{d''''d'^2}{d^4}$$

$$-120\frac{d'''d''d'}{d^4}+240\frac{d'''d'^3}{d^5}-45\cdot 2\frac{d''^3}{d^4}-45\cdot 4\frac{d'd''d'''}{d^4}+45\cdot 8\frac{d'^2d''^2}{d^5}$$

$$+60\cdot 12\frac{d'^2d''^2}{d^5}+60\cdot 4\frac{d'^3d'''}{d^5}-60\cdot 20\frac{d'^4d''}{d^6}-24\cdot 25\frac{d'^4d''}{d^6}+24\cdot 30\frac{d'^6}{d^7}$$

i.e. 2⑥:

$$\frac{c''''''}{c^2}+\frac{d''''''}{d^2}=12\frac{c'c'''''}{c^3}+30\frac{c''c''''}{c^3}-90\frac{c'^2c''''}{c^4}+20\frac{c'''^2}{c^3}+60\cdot 8\frac{c'^3c'''}{c^5}-90\cdot 4\frac{c'c''c'''}{c^4}$$

$$-45\cdot 2\frac{c''^3}{c^4}+45\cdot 24\frac{c'^2c''^2}{c^5}-60\cdot 30\frac{c'^4c''}{c^6}+24\cdot 30\frac{c'^6}{c^7}$$

$$12\frac{d'd'''''}{d^3}+30\frac{d''d''''}{d^3}-90\frac{d'^2d''''}{d^4}+20\frac{d'''^2}{d^3}+60\cdot 8\frac{d'^3d'''}{d^5}-90\cdot 4\frac{d'd''d'''}{d^4}$$

$$-45\cdot 2\frac{d''^3}{d^4}+45\cdot 24\frac{d'^2d''^2}{d^5}-60\cdot 30\frac{d'^4d''}{d^6}+24\cdot 30\frac{d'^6}{d^7}$$

$$\ldots\ldots\ldots\ldots\ldots\frac{d^6}{dv^6}\ (19)$$

From $f_3=0$ (i.e. $bc-ad-v(c+d)=0$) derivation, we obtain

3①: $b'c+bc'-a'd-ad'-(c+d)-v(c'+d')=0\ \ldots\ldots\ldots\ldots\ldots\frac{d}{dv}(f_3=0)$

3②: $b''c+2b'c'+bc''-a''d-2a'd'-ad''-2(c'+d')-v(c''+d'')=0\ \ldots\ldots\frac{d^2}{dv^2}(f_3=0)$

3③: $b'''c+3b''c'+3b'c''+bc'''-a'''d-3a''d'-3a'd''-ad'''-3(c''+d'')-v(c'''+d''')=0$

$\ldots\ldots\ldots\ldots\ldots\frac{d^3}{dv^3}(f_3=0)$ i.e.

$$-a'''d+b'''c+bc'''-ad'''=3a''d'+3a'd''-3b'c''-3b''c'+3(c''+d'')+v(c'''+d''')$$

3④:

$$b''''c+4b'''c'+6b''c''+4b'c'''+bc''''$$

$$-a''''d-4a'''d'-6a''d''-4a'd'''-ad''''-4(c'''+d''')-v(c''''+d'''')=0$$

i.e.

$$-a''''d+b''''c+bc''''-ad''''$$

$$=4a'''d'+4a'd'''+6a''d''-6b''c''-4b'c'''-4b'''c'+4(c'''+d''')+v(c''''+d'''')$$

$$\ldots\ldots\ldots\ldots\ldots \frac{d^4}{dv^4}(f_3 = 0)$$

3⑤:

$$b'''''c + 5b''''c' + 10b'''c'' + 10b''c''' + 5b'c'''' + bc'''''$$

$$-a'''''d - 5a''''d' - 10a'''d'' - 10a''d''' - 5a'd'''' - ad''''' - 5(c'''' + d'''') - v(c''''' + d''''') = 0$$

i.e. 3⑤:

$$-a'''''d + b'''''c + bc''''' - ad''''' =$$

$$-5b''''c' - 10b'''c'' - 10b''c''' - 5b'c'''' + 5a''''d' + 10a'''d'' + 10a''d''' + 5a'd''''$$

$$+5(c'''' + d'''') + v(c''''' + d''''')$$

$$\ldots\ldots\ldots\ldots\ldots \frac{d^5}{dv^5}(f_3 = 0)$$

3⑥:

$$-a''''''d - a'''''d' + b''''''c + b'''''c' + b'c''''' + bc'''''' - a'd''''' - ad'''''' =$$

$$-5b'''''c' - 5b''''c'' - 10b''''c'' - 10b'''c''' - 10b'''c''' - 10b''c''''$$

$$-5b''c'''' - 5b'c''''' + 5a'''''d' + 5a''''d'' + 10a''''d'' + 10a'''d''' + 10a'''d''' + 10a''d'''' + 5a''d''''$$

$$+5a'd''''' + 6(c''''' + d''''') + v(c'''''' + d'''''')$$

i.e.3⑥:

$$-a''''''d + b''''''c + bc'''''' - ad'''''' =$$

$$6a'''''d' + 6a'd''''' - 6b'''''c' - 6b'c''''' - 15b''''c'' - 20b'''c''' - 15b''c'''' + 15a''''d'' + 20a'''d'''$$

$$+15a''d'''' + 6(c''''' + d''''') + v(c'''''' + d'''''')$$

$$\ldots\ldots\ldots\ldots\ldots \frac{d^6}{dv^6}(f_3 = 0)$$

From (30) i.e. $\frac{(c-d)\sqrt{\varphi_3}}{(b-a)} = \frac{1}{\sigma}$ ( $\sigma = \frac{M_0}{M_{a0}}$ ) i.e. $(c-d)\sqrt{\varphi_3} = \frac{1}{\sigma}(b-a)$ , then the first derivation $\frac{d}{dv}\left[(c-d)\sqrt{\varphi_3} = \frac{1}{\sigma}(b-a)\right]$ is:

4①: $(c'-d')\sqrt{\varphi_3} + (c-d)(\sqrt{\varphi_3})' = \frac{1}{\sigma}(b'-a')$

i.e. $(c'-d')\sqrt{\varphi_3} + (c-d)\frac{\varphi_3'}{2\sqrt{\varphi_3}} = \frac{1}{\sigma}(b'-a') \ldots\ldots\ldots\ldots\ldots \frac{d}{dv}\left[(c-d)\sqrt{\varphi_3} = \frac{1}{\sigma}(b-a)\right]$

The second derivation $\frac{d^2}{dv^2}\left[(c-d)\sqrt{\varphi_3} = \frac{1}{\sigma}(b-a)\right]$ is

4②: $(c''-d'')\sqrt{\varphi_3} + 2(c'-d')(\sqrt{\varphi_3})' + (c-d)(\sqrt{\varphi_3})'' = \frac{1}{\sigma}(b''-a'')$

i.e. $(c''-d'')\sqrt{\varphi_3} + 2(c'-d')\frac{\varphi_3'}{2\sqrt{\varphi_3}} + (c-d)\left[\frac{\varphi_3''}{2\sqrt{\varphi_3}} - \frac{\varphi_3'^2}{4\left(\sqrt{\varphi_3}\right)^3}\right] = \frac{1}{\sigma}(b''-a'')$

The third derivation $\frac{d^3}{dv^3}\left[(c-d)\sqrt{\varphi_3}=\frac{1}{\sigma}(b-a)\right]$ is

$$4③: (c'''-d''')\sqrt{\varphi_3}+3(c''-d'')(\sqrt{\varphi_3})'+3(c'-d')(\sqrt{\varphi_3})''+(c-d)(\sqrt{\varphi_3})'''=\frac{1}{\sigma}(b'''-a''')$$

i.e.

$$(c'''-d''')\sqrt{\varphi_3}+3(c''-d'')\frac{\varphi_3'}{2\sqrt{\varphi_3}}+3(c'-d')\left[\frac{\varphi_3''}{2\sqrt{\varphi_3}}+\frac{\varphi_3'^2}{2(\sqrt{\varphi_3})^3}\frac{(-1)}{2}\right]$$

$$+(c-d)\left[\frac{\varphi_3'''}{2\sqrt{\varphi_3}}+\frac{\varphi_3''\varphi_3'}{2(\sqrt{\varphi_3})^3}\frac{(-1)}{2}+\frac{\varphi_3'\varphi_3''}{\left(\sqrt{\varphi_3}\right)^3}\frac{(-1)}{2}-\frac{\varphi_3'^3}{4\left(\sqrt{\varphi_3}\right)^5}\frac{(-3)}{2}\right]=\frac{1}{\sigma}(b'''-a''')$$

or

$$(c'''-d''')\sqrt{\varphi_3}+3(c''-d'')\frac{\varphi_3'}{2\sqrt{\varphi_3}}+3(c'-d')\left[\frac{\varphi_3''}{2\sqrt{\varphi_3}}+\frac{\varphi_3'^2}{2(\sqrt{\varphi_3})^3}\frac{(-1)}{2}\right]$$

$$+(c-d)\left[\frac{\varphi_3'''}{2\sqrt{\varphi_3}}-\frac{3\varphi_3''\varphi_3'}{4(\sqrt{\varphi_3})^3}+\frac{3\varphi_3'^3}{8\left(\sqrt{\varphi_3}\right)^5}\right]=\frac{1}{\sigma}(b'''-a''')$$

…………… $\frac{d^3}{dv^3}\left[(c-d)\sqrt{\varphi_3}=\frac{1}{\sigma}(b-a)\right]$

The fourth derivation $\frac{d^4}{dv^4}\left[(c-d)\sqrt{\varphi_3}=\frac{1}{\sigma}(b-a)\right]$ is

$$4④: (c''''-d'''')\sqrt{\varphi_3}+4(c'''-d''')(\sqrt{\varphi_3})'+6(c''-d'')(\sqrt{\varphi_3})''+4(c'-d')(\sqrt{\varphi_3})'''$$

$$+(c-d)(\sqrt{\varphi_3})''''=\frac{1}{\sigma}(b''''-a'''')$$

i.e.

$$(c''''-d'''')\sqrt{\varphi_3}+4(c'''-d''')\frac{\varphi_3'}{2\sqrt{\varphi_3}}+6(c''-d'')\left[\frac{\varphi_3''}{2\sqrt{\varphi_3}}+\frac{\varphi_3'^2}{2(\sqrt{\varphi_3})^3}\frac{(-1)}{2}\right]$$

$$+4(c'-d')\left[\frac{\varphi_3'''}{2\sqrt{\varphi_3}}-\frac{3\varphi_3''\varphi_3'}{4(\sqrt{\varphi_3})^3}+\frac{3\varphi_3'^3}{8\left(\sqrt{\varphi_3}\right)^5}\right]$$

$$+(c-d)\left[\frac{\varphi_3''''}{2\sqrt{\varphi_3}}+\frac{\varphi_3'''\varphi_3'}{2(\sqrt{\varphi_3})^3}\frac{(-1)}{2}-\frac{3\varphi_3'''\varphi_3'}{4(\sqrt{\varphi_3})^3}-\frac{3\varphi_3''^2}{4(\sqrt{\varphi_3})^3}-\frac{3\varphi_3''\varphi_3'^2}{4(\sqrt{\varphi_3})^5}\frac{(-3)}{2}\right.$$

$$\left.+\frac{9\varphi_3'^2\varphi_3''}{8\left(\sqrt{\varphi_3}\right)^5}+\frac{3\varphi_3'^4}{8\left(\sqrt{\varphi_3}\right)^7}\frac{(-5)}{2}\right]=\frac{1}{\sigma}(b''''-a'''')$$

i.e.

$$(c'''' - d'''')\sqrt{\varphi_3} + 4(c''' - d''')\frac{\varphi_3'}{2\sqrt{\varphi_3}} + 6(c'' - d'')\left[\frac{\varphi_3''}{2\sqrt{\varphi_3}} + \frac{\varphi_3'^2}{2(\sqrt{\varphi_3})^3}\frac{(-1)}{2}\right]$$

$$+ 4(c' - d')\left[\frac{\varphi_3'''}{2\sqrt{\varphi_3}} - \frac{3\varphi_3''\varphi_3'}{4(\sqrt{\varphi_3})^3} + \frac{3\varphi_3'^3}{8\left(\sqrt{\varphi_3}\right)^5}\right] + (c - d)\left[\frac{\varphi_3''''}{2\sqrt{\varphi_3}} - \frac{\varphi_3'''\varphi_3'}{(\sqrt{\varphi_3})^3} - \frac{3\varphi_3''^2}{4(\sqrt{\varphi_3})^3}\right.$$

$$\left. + \frac{9\varphi_3'^2\varphi_3''}{4\left(\sqrt{\varphi_3}\right)^5} + \frac{3\varphi_3'^4}{8\left(\sqrt{\varphi_3}\right)^7}\frac{(-5)}{2}\right] = \frac{1}{\sigma}(b'''' - a'''')$$

$$\cdots\cdots\cdots\cdots \frac{d^4}{dv^4}\left[(c - d)\sqrt{\varphi_3} = \frac{1}{\sigma}(b - a)\right]$$

4⑤:

$$(c''''' - d''''')\sqrt{\varphi_3} + 5(c'''' - d'''')(\sqrt{\varphi_3})' + 10(c''' - d''')(\sqrt{\varphi_3})'' + 10(c'' - d'')(\sqrt{\varphi_3})'''$$

$$+ 5(c' - d')(\sqrt{\varphi_3})'''' + (c - d)(\sqrt{\varphi_3})''''' = \frac{1}{\sigma}(b''''' - a''''')$$

i.e. 4⑤:

$$(c''''' - d''''')\sqrt{\varphi_3} + 5(c'''' - d'''')\frac{\varphi_3'}{2\sqrt{\varphi_3}} + 10(c''' - d''')\left[\frac{\varphi_3''}{2\sqrt{\varphi_3}} + \frac{\varphi_3'^2}{2(\sqrt{\varphi_3})^3}\frac{(-1)}{2}\right]$$

$$+ 10(c'' - d'')\left[\frac{\varphi_3'''}{2\sqrt{\varphi_3}} - \frac{3\varphi_3''\varphi_3'}{4(\sqrt{\varphi_3})^3} + \frac{3\varphi_3'^3}{8\left(\sqrt{\varphi_3}\right)^5}\right]$$

$$+ 5(c' - d')\left[\frac{\varphi_3''''}{2\sqrt{\varphi_3}} - \frac{\varphi_3'''\varphi_3'}{(\sqrt{\varphi_3})^3} - \frac{3\varphi_3''^2}{4(\sqrt{\varphi_3})^3} + \frac{9\varphi_3'^2\varphi_3''}{4\left(\sqrt{\varphi_3}\right)^5} + \frac{3\varphi_3'^4}{8\left(\sqrt{\varphi_3}\right)^7}\frac{(-5)}{2}\right]$$

$$+ (c - d)\left[\frac{\varphi_3'''''}{2\sqrt{\varphi_3}} - \frac{\varphi_3'\varphi_3''''}{4(\sqrt{\varphi_3})^3} - \frac{\varphi_3'\varphi_3''''}{(\sqrt{\varphi_3})^3} - \frac{\varphi_3''\varphi_3'''}{(\sqrt{\varphi_3})^3} + \frac{3\varphi_3'''\varphi_3'^2}{2(\sqrt{\varphi_3})^5} - \frac{6\varphi_3''\varphi_3'''}{4(\sqrt{\varphi_3})^3} - \frac{9\varphi_3'\varphi_3''^2}{8(\sqrt{\varphi_3})^5}\right.$$

$$\left. + \frac{18\varphi_3'\varphi_3''^2}{4\left(\sqrt{\varphi_3}\right)^5} + \frac{9\varphi_3'^2\varphi_3'''}{4\left(\sqrt{\varphi_3}\right)^5} - \frac{45\varphi_3'^3\varphi_3''}{8\left(\sqrt{\varphi_3}\right)^7} - \frac{15 \cdot 4\varphi_3'^3\varphi_3''}{16\left(\sqrt{\varphi_3}\right)^7} + \frac{15 \cdot 7\varphi_3'^5}{32\left(\sqrt{\varphi_3}\right)^7}\right] = \frac{1}{\sigma}(b''''' - a''''')$$

i.e. 4⑤:

$$(c''''' - d''''')\sqrt{\varphi_3} + 5(c'''' - d'''')\frac{\varphi_3'}{2\sqrt{\varphi_3}} + 10(c''' - d''')\left[\frac{\varphi_3''}{2\sqrt{\varphi_3}} + \frac{\varphi_3'^2}{2(\sqrt{\varphi_3})^3}\frac{(-1)}{2}\right]$$

$$+10(c'' - d'')\left[\frac{\varphi_3'''}{2\sqrt{\varphi_3}} - \frac{3\varphi_3''\varphi_3'}{4(\sqrt{\varphi_3})^3} + \frac{3\varphi_3'^3}{8\left(\sqrt{\varphi_3}\right)^5}\right]$$

$$+5(c' - d')\left[\frac{\varphi_3''''}{2\sqrt{\varphi_3}} - \frac{\varphi_3'''\varphi_3'}{(\sqrt{\varphi_3})^3} - \frac{3\varphi_3''^2}{4(\sqrt{\varphi_3})^3} + \frac{9\varphi_3'^2\varphi_3''}{4\left(\sqrt{\varphi_3}\right)^5} + \frac{3\varphi_3'^4}{8\left(\sqrt{\varphi_3}\right)^7}\frac{(-5)}{2}\right]$$

$$+(c - d)\left[\frac{\varphi_3'''''}{2\sqrt{\varphi_3}} - \frac{5\varphi_3'\varphi_3''''}{4(\sqrt{\varphi_3})^3} - \frac{10\varphi_3''\varphi_3'''}{4(\sqrt{\varphi_3})^3} + \frac{15\varphi_3'''\varphi_3'^2}{4(\sqrt{\varphi_3})^5} + \frac{27\varphi_3'\varphi_3''^2}{8\left(\sqrt{\varphi_3}\right)^5} - \frac{15\cdot 5\varphi_3'^3\varphi_3''}{8\left(\sqrt{\varphi_3}\right)^7} + \frac{15\cdot 7\varphi_3'^5}{32\left(\sqrt{\varphi_3}\right)^7}\right]$$

$$= \frac{1}{\sigma}(b''''' - a''''')$$

$$\ldots\ldots\ldots\ldots \frac{d^5}{dv^5}\left[(c - d)\sqrt{\varphi_3} = \frac{1}{\sigma}(b - a)\right]$$

4⑥:

$$(c'''''' - d'''''')\sqrt{\varphi_3} + 6(c''''' - d''''')(\sqrt{\varphi_3})' + 15(c'''' - d'''')(\sqrt{\varphi_3})'' + 20(c''' - d''')(\sqrt{\varphi_3})'''$$

$$+15(c'' - d'')(\sqrt{\varphi_3})'''' + 6(c' - d')(\sqrt{\varphi_3})''''' + (c - d)(\sqrt{\varphi_3})'''''' = \frac{1}{\sigma}(b'''''' - a'''''')$$

i.e. 4⑥:

$$(c'''''' - d'''''')\sqrt{\varphi_3} + 6(c''''' - d''''')\frac{\varphi_3'}{2\sqrt{\varphi_3}} + 15(c'''' - d'''')\left[\frac{\varphi_3''}{2\sqrt{\varphi_3}} + \frac{\varphi_3'^2}{2(\sqrt{\varphi_3})^3}\frac{(-1)}{2}\right]$$

$$+20(c''' - d''')\left[\frac{\varphi_3'''}{2\sqrt{\varphi_3}} - \frac{3\varphi_3''\varphi_3'}{4(\sqrt{\varphi_3})^3} + \frac{3\varphi_3'^3}{8\left(\sqrt{\varphi_3}\right)^5}\right]$$

$$+15(c'' - d'')\left[\frac{\varphi_3''''}{2\sqrt{\varphi_3}} - \frac{\varphi_3'''\varphi_3'}{(\sqrt{\varphi_3})^3} - \frac{3\varphi_3''^2}{4(\sqrt{\varphi_3})^3} + \frac{9\varphi_3'^2\varphi_3''}{4\left(\sqrt{\varphi_3}\right)^5} + \frac{3\varphi_3'^4}{8\left(\sqrt{\varphi_3}\right)^7}\frac{(-5)}{2}\right]$$

$$+6(c' - d')\left[\frac{\varphi_3'''''}{2\sqrt{\varphi_3}} - \frac{5\varphi_3'\varphi_3''''}{4(\sqrt{\varphi_3})^3} - \frac{10\varphi_3''\varphi_3'''}{4(\sqrt{\varphi_3})^3} + \frac{15\varphi_3'''\varphi_3'^2}{4(\sqrt{\varphi_3})^5} + \frac{27\varphi_3'\varphi_3''^2}{8\left(\sqrt{\varphi_3}\right)^5} - \frac{15\cdot 5\varphi_3'^3\varphi_3''}{8\left(\sqrt{\varphi_3}\right)^7} + \frac{15\cdot 7\varphi_3'^5}{32\left(\sqrt{\varphi_3}\right)^7}\right]$$

$$+(c - d)\left[\frac{\varphi_3''''''}{2\sqrt{\varphi_3}} - \frac{3\varphi_3'\varphi_3'''''}{2(\sqrt{\varphi_3})^3} - \frac{15\varphi_3''\varphi_3''''}{4(\sqrt{\varphi_3})^3} + \frac{45\varphi_3'^2\varphi_3''''}{8(\sqrt{\varphi_3})^5} + \frac{72\varphi_3'\varphi_3''\varphi_3'''}{4\left(\sqrt{\varphi_3}\right)^5} - \frac{10\varphi_3'''^2}{4(\sqrt{\varphi_3})^3} - \frac{15\cdot 5\varphi_3'^3\varphi_3'''}{4\left(\sqrt{\varphi_3}\right)^7}\right.$$

$$\left.+\frac{27\varphi_3''^3}{8\left(\sqrt{\varphi_3}\right)^5} - \frac{15\cdot 39\varphi_3'^2\varphi_3''^2}{16\left(\sqrt{\varphi_3}\right)^7} + \frac{15^2\cdot 7\cdot 5\varphi_3'^4\varphi_3''}{2\cdot 16\left(\sqrt{\varphi_3}\right)^7} - \frac{15\cdot 49\varphi_3'^6}{64\left(\sqrt{\varphi_3}\right)^9}\right] = \frac{1}{\sigma}(b'''''' - a'''''')$$

$$\cdots\cdots\cdots\frac{d^6}{dv^6}\left[(c-d)\sqrt{\varphi_3}=\frac{1}{\sigma}(b-a)\right]$$

From $\varphi_3=\dfrac{\frac{ac}{d}+\frac{bd}{c}+v\left(\frac{bd}{ac}-\frac{ac}{bd}\right)}{\frac{ac}{b}+\frac{bd}{a}}$ i.e. $\varphi_3\left(\frac{ac}{b}+\frac{bd}{a}\right)=\frac{ac}{d}+\frac{bd}{c}+v\left(\frac{bd}{ac}-\frac{ac}{bd}\right)$ making derivation, we obtain the first derivation $\frac{d}{dv}\left[\left(\frac{ac}{b}+\frac{bd}{a}\right)(\varphi_3=)\right]$ is

5①: $\varphi_3'\left(\frac{ac}{b}+\frac{bd}{a}\right)+\varphi_3\left(\frac{ac}{b}+\frac{bd}{a}\right)'=\left(\frac{ac}{d}+\frac{bd}{c}\right)'+\left(\frac{bd}{ac}-\frac{ac}{bd}\right)+v\left(\frac{bd}{ac}-\frac{ac}{bd}\right)'$ i.e.

$$\varphi_3'\left(\frac{ac}{b}+\frac{bd}{a}\right)+\varphi_3\left[\left(\frac{a'c}{b}+\frac{ac'}{b}-\frac{ab'c}{b^2}\right)+\left(\frac{b'd}{a}+\frac{bd'}{a}-\frac{a'bd}{a^2}\right)\right]$$

$$=\left(\frac{a'c}{d}+\frac{ac'}{d}-\frac{acd'}{d^2}\right)+\left(\frac{b'd}{c}+\frac{bd'}{c}-\frac{bc'd}{c^2}\right)+\left(\frac{bd}{ac}-\frac{ac}{bd}\right)+v\frac{d}{dv}\left(\frac{bd}{ac}-\frac{ac}{bd}\right)$$

The second derivation $\frac{d^2}{dv^2}\left[\left(\frac{ac}{b}+\frac{bd}{a}\right)(\varphi_3=)\right]$ is 5②:

$$\varphi_3''\left(\frac{ac}{b}+\frac{bd}{a}\right)+2\varphi_3'\left(\frac{ac}{b}+\frac{bd}{a}\right)'+\left(\frac{ac}{b}+\frac{bd}{a}\right)''$$

$$=\left(\frac{ac}{d}+\frac{bd}{c}\right)''+2\left(\frac{bd}{ac}-\frac{ac}{bd}\right)'+v\left(\frac{bd}{ac}-\frac{ac}{bd}\right)''$$

i.e. 5②: $\varphi_3''\left(\frac{ac}{b}+\frac{bd}{a}\right)+2\varphi_3'\left(\frac{a'c}{b}+\frac{ac'}{b}-\frac{ab'c}{b^2}+\frac{b'd}{a}+\frac{bd'}{a}-\frac{a'bd}{a^2}\right)$

$$+\varphi_3\left(\frac{a''c}{b}+\frac{a'c'}{b}-\frac{a'b'c}{b^2}+\frac{a'c'}{b}+\frac{ac''}{b}-\frac{ab'c'}{b^2}-\frac{a'b'c}{b^2}-\frac{ab''c}{b^2}-\frac{ab'c'}{b^2}+2\frac{ab'^2c}{b^3}\right.$$

$$\left.+\frac{b''d}{a}+\frac{b'd'}{a}-\frac{a'b'd}{a^2}+\frac{b'd'}{a}+\frac{bd''}{a}-\frac{a'bd'}{a^2}-\frac{a''bd}{a^2}-\frac{a'b'd}{a^2}-\frac{a'bd'}{a^2}+2\frac{a'^2bd}{a^3}\right)$$

$$=\left(\frac{a''c}{d}+\frac{a'c'}{d}-\frac{a'cd'}{d^2}+\frac{a'c'}{d}+\frac{ac''}{d}-\frac{ac'd'}{d^2}-\frac{a'cd'}{d^2}-\frac{ac'd'}{d^2}-\frac{acd''}{d^2}+2\frac{acd'^2}{d^3}\right)$$

$$+\left(\frac{b''d}{c}+\frac{b'd'}{c}-\frac{b'c'd}{c^2}+\frac{b'd'}{c}+\frac{bd''}{c}-\frac{bc'd'}{c^2}-\frac{b'c'd}{c^2}-\frac{bc''d}{c^2}-\frac{bc'd'}{c^2}+2\frac{bc'^2d}{c^3}\right)$$

$$+2\left(\frac{b'd}{ac}+\frac{bd'}{ac}-\frac{a'bd}{a^2c}-\frac{bc'd}{ac^2}-\frac{a'c}{bd}-\frac{ac'}{bd}+\frac{ab'c}{b^2d}+\frac{acd'}{bd^2}\right)+v\frac{d^2}{dv^2}\left(\frac{bd}{ac}-\frac{ac}{bd}\right)$$

Merging the same kind term the 5② becomes

$$\varphi_3''\left(\frac{ac}{b}+\frac{bd}{a}\right)+2\varphi_3'\left(\frac{a'c}{b}+\frac{ac'}{b}-\frac{ab'c}{b^2}+\frac{b'd}{a}+\frac{bd'}{a}-\frac{a'bd}{a^2}\right)$$

$$+\varphi_3\left(\frac{a''c}{b}+2\frac{a'c'}{b}+\frac{ac''}{b}-\frac{ab''c}{b^2}-2\frac{ab'c'}{b^2}-2\frac{a'b'c}{b^2}+2\frac{ab'^2c}{b^3}\right.$$

$$\left.+\frac{b''d}{a}+2\frac{b'd'}{a}+\frac{bd''}{a}-\frac{a''bd}{a^2}-2\frac{a'b'd}{a^2}-2\frac{a'bd'}{a^2}+2\frac{a'^2bd}{a^3}\right)$$

$$=\left(\frac{a''c}{d}+2\frac{a'c'}{d}+\frac{ac''}{d}-\frac{acd''}{d^2}-2\frac{a'cd'}{d^2}-2\frac{ac'd'}{d^2}+2\frac{acd'^2}{d^3}\right)$$

$$+\left(\frac{b''d}{c}+2\frac{b'd'}{c}+\frac{bd''}{c}-\frac{bc''d}{c^2}-2\frac{b'c'd}{c^2}-2\frac{bc'd'}{c^2}+2\frac{bc'^2d}{c^3}\right)$$

$$+2\left(\frac{b'd}{ac}+\frac{bd'}{ac}-\frac{a'bd}{a^2c}-\frac{bc'd}{ac^2}-\frac{a'c}{bd}-\frac{ac'}{bd}+\frac{ab'c}{b^2d}+\frac{acd'}{bd^2}\right)+v\frac{d^2}{dv^2}\left(\frac{bd}{ac}-\frac{ac}{bd}\right)$$

The third derivation $\frac{d^3}{dv^3}\left[\left(\frac{ac}{b}+\frac{bd}{a}\right)(\varphi_3=)\right]$ is

$$5③:\varphi_3'''\cdot\left(\frac{ac}{b}+\frac{bd}{a}\right)+3\varphi_3''\cdot\left(\frac{a'c}{b}+\frac{ac'}{b}-\frac{ab'c}{b^2}+\frac{b'd}{a}+\frac{bd'}{a}-\frac{a'bd}{a^2}\right)$$

$$+3\varphi_3'\left(\frac{a''c}{b}+2\frac{a'c'}{b}+\frac{ac''}{b}-\frac{ab''c}{b^2}-2\frac{ab'c'}{b^2}-2\frac{a'b'c}{b^2}+2\frac{ab'^2c}{b^3}\right.$$

$$\left.+\frac{b''d}{a}+2\frac{b'd'}{a}+\frac{bd''}{a}-\frac{a''bd}{a^2}-2\frac{a'b'd}{a^2}-2\frac{a'bd'}{a^2}+2\frac{a'^2bd}{a^3}\right)$$

$$+\varphi_3\left(\frac{a'''c}{b}+\frac{a''c'}{b}-\frac{a''b'c}{b^2}+2\frac{a''c'}{b}+2\frac{a'c''}{b}-2\frac{a'b'c'}{b^2}+\frac{a'c''}{b}+\frac{ac'''}{b}-\frac{ab'c''}{b^2}\right.$$

$$-\frac{a'b''c}{b^2}-\frac{ab'''c}{b^2}-\frac{ab''c'}{b^2}+2\frac{ab'b''c}{b^3}-2\frac{a'b'c'}{b^2}-2\frac{ab''c'}{b^2}-2\frac{ab'c''}{b^2}+4\frac{ab'^2c'}{b^3}$$

$$-2\frac{a''b'c}{b^2}-2\frac{a'b''c}{b^2}-2\frac{a'b'c'}{b^2}+4\frac{a'b'^2c}{b^3}+2\frac{a'b'^2c}{b^3}+4\frac{ab'b''c}{b^3}+2\frac{ab'^2c'}{b^3}-6\frac{ab'^3c}{b^4}$$

$$+\frac{b'''d}{a}+\frac{b''d'}{a}-\frac{a'b''d}{a^2}+2\frac{b''d'}{a}+2\frac{b'd''}{a}-2\frac{a'b'd'}{a^2}+\frac{b'd''}{a}+\frac{bd'''}{a}-\frac{a'bd''}{a^2}$$

$$-\frac{a'''bd}{a^2}-\frac{a''b'd}{a^2}-\frac{a''bd'}{a^2}+2\frac{a'a''bd}{a^3}-2\frac{a''b'd}{a^2}-2\frac{a'b''d}{a^2}-2\frac{a'b'd'}{a^2}+4\frac{a'^2b'd}{a^3}$$

$$\left.-2\frac{a''bd'}{a^2}-2\frac{a'b'd'}{a^2}-2\frac{a'bd''}{a^2}+4\frac{a'^2bd'}{a^3}+4\frac{a'a''bd}{a^3}+2\frac{a'^2b'd}{a^3}+2\frac{a'^2bd'}{a^3}-6\frac{a'^3bd}{a^4}\right)$$

$$=\left(\frac{a'''c}{d}+\frac{a''c'}{d}-\frac{a''cd'}{d^2}+2\frac{a''c'}{d}+2\frac{a'c''}{d}-2\frac{a'c'd'}{d^2}+\frac{a'c''}{d}+\frac{ac'''}{d}-\frac{ac''d'}{d^2}\right.$$

$$-\frac{a'cd''}{d^2}-\frac{ac'd''}{d^2}-\frac{acd'''}{d^2}+2\frac{acd'd''}{d^3}-2\frac{a''cd'}{d^2}-2\frac{a'c'd'}{d^2}-2\frac{a'cd''}{d^2}+4\frac{a'cd'^2}{d^3}$$

$$\left.-2\frac{a'c'd'}{d^2}-2\frac{ac''d'}{d^2}-2\frac{ac'd''}{d^2}+4\frac{ac'd'^2}{d^3}+2\frac{a'cd'^2}{d^3}+2\frac{ac'd'^2}{d^3}+4\frac{acd'd''}{d^3}-6\frac{acd'^3}{d^4}\right)$$

$$+\left(\frac{b'''d}{c}+\frac{b''d'}{c}-\frac{b''c'd}{c^2}+2\frac{b''d'}{c}+2\frac{b'd''}{c}-2\frac{b'c'd'}{c^2}+\frac{b'd''}{c}+\frac{bd'''}{c}-\frac{bc'd''}{c^2}\right.$$

$$-\frac{b'c''d}{c^2}-\frac{bc'''d}{c^2}-\frac{bc''d'}{c^2}+2\frac{bc'c''d}{c^3}-2\frac{b''c'd}{c^2}-2\frac{b'c''d}{c^2}-2\frac{b'c'd'}{c^2}+4\frac{b'c'^2d}{c^3}$$

$$\left.-2\frac{b'c'd'}{c^2}-2\frac{bc''d'}{c^2}-2\frac{bc'd''}{c^2}+4\frac{bc'^2d'}{c^3}+2\frac{b'c'^2d}{c^3}+4\frac{bc'c''d}{c^3}+2\frac{bc'^2d'}{c^3}-6\frac{bc'^3d}{c^4}\right)$$

$$+3\left(\frac{b''d}{ac}+\frac{b'd'}{ac}-\frac{a'b'd}{a^2c}-\frac{b'c'd}{ac^2}+\frac{b'd'}{ac}+\frac{bd''}{ac}-\frac{a'bd'}{a^2c}-\frac{bc'd'}{ac^2}\right.$$

$$-\frac{a''bd}{a^2c}-\frac{a'b'd}{a^2c}-\frac{a'bd'}{a^2c}+2\frac{a'^2bd}{a^3c}+\frac{a'bc'd}{a^2c^2}-\frac{b'c'd}{ac^2}-\frac{bc''d}{ac^2}-\frac{bc'd'}{ac^2}+\frac{a'bc'd}{a^2c^2}+2\frac{bc'^2d}{ac^3}$$

$$-\frac{a''c}{bd}-\frac{a'c'}{bd}+\frac{a'b'c}{b^2d}+\frac{a'cd'}{bd^2}-\frac{a'c'}{bd}-\frac{ac''}{bd}+\frac{ab'c'}{b^2d}+\frac{ac'd'}{bd^2}$$

$$\left.+\frac{a'b'c}{b^2d}+\frac{ab''c}{b^2d}+\frac{ab'c'}{b^2d}-2\frac{ab'^2c}{b^3d}-\frac{ab'cd'}{b^2d^2}+\frac{a'cd'}{bd^2}+\frac{ac'd'}{bd^2}+\frac{acd''}{bd^2}-\frac{ab'cd'}{b^2d^2}-2\frac{acd'^2}{bd^3}\right)$$

$$+v\frac{d^3}{dv^3}\left(\frac{bd}{ac}-\frac{ac}{bd}\right)$$

Merging the same kind term the 5③ becomes

$$\varphi_3'''\left(\frac{ac}{b}+\frac{bd}{a}\right)+3\varphi_3''\left(\frac{a'c}{b}+\frac{ac'}{b}-\frac{acb'}{b^2}+\frac{b'd}{a}+\frac{bd'}{a}-\frac{a'bd}{a^2}\right)$$

$$+3\varphi_3'\left(\frac{a''c}{b}+2\frac{a'c'}{b}+\frac{ac''}{b}-\frac{ab''c}{b^2}-2\frac{ab'c'}{b^2}-2\frac{a'b'c}{b^2}+2\frac{ab'^2c}{b^3}\right.$$

$$\left.+\frac{b''d}{a}+2\frac{b'd'}{a}+\frac{bd''}{a}-\frac{a''bd}{a^2}-2\frac{a'b'd}{a^2}-2\frac{a'bd'}{a^2}+2\frac{a'^2bd}{a^3}\right)$$

$$+\varphi_3\left(\frac{a'''c}{b}+\frac{ac'''}{b}+3\frac{a''c'}{b}+3\frac{a'c''}{b}-\frac{ab'''c}{b^2}-3\frac{a''b'c}{b^2}-3\frac{a'b''c}{b^2}-3\frac{ab''c'}{b^2}-3\frac{ab'c''}{b^2}\right.$$

$$-6\frac{a'b'c'}{b^2}+6\frac{a'b'^2c}{b^3}+6\frac{ab'^2c'}{b^3}+6\frac{ab'b''c}{b^3}-6\frac{ab'^3c}{b^4}$$

$$+\frac{b'''d}{a}+\frac{bd'''}{a}+3\frac{b''d'}{a}+3\frac{b'd''}{a}-\frac{a'''bd}{a^2}-3\frac{a''b'd}{a^2}-3\frac{a'b''d}{a^2}-3\frac{a'bd''}{a^2}-3\frac{a''bd'}{a^2}$$

$$\left.-6\frac{a'b'd'}{a^2}+6\frac{a'^2b'd}{a^3}+6\frac{a'^2bd'}{a^3}+6\frac{a'a''bd}{a^3}-6\frac{a'^3bd}{a^4}\right)$$

$$=\left(\frac{a'''c}{d}+\frac{ac'''}{d}+3\frac{a''c'}{d}+3\frac{a'c''}{d}-\frac{acd'''}{d^2}-3\frac{a''cd'}{d^2}-3\frac{ac''d'}{d^2}-3\frac{a'cd''}{d^2}\right.$$

$$\left.-3\frac{ac'd''}{d^2}-6\frac{a'c'd'}{d^2}+6\frac{ac'd'^2}{d^3}+6\frac{a'cd'^2}{d^3}+6\frac{acd'd''}{d^3}-6\frac{acd'^3}{d^4}\right)$$

$$+\left(\frac{b'''d}{c}+\frac{bd'''}{c}+3\frac{b''d'}{c}+3\frac{b'd''}{c}-\frac{bc'''d}{c^2}-3\frac{b''c'd}{c^2}-3\frac{b'c''d}{c^2}-3\frac{bc'd''}{c^2}\right.$$

$$\left.-3\frac{bc''d'}{c^2}-6\frac{b'c'd'}{c^2}+6\frac{b'c'^2d}{c^3}+6\frac{bc'^2d'}{c^3}+6\frac{bc'c''d}{c^3}-6\frac{bc'^3d}{c^4}\right)$$

$$+3\left(\frac{b''d}{ac}+2\frac{b'd'}{ac}+\frac{bd''}{ac}-\frac{bc''d}{ac^2}-2\frac{b'c'd}{ac^2}-2\frac{bc'd'}{ac^2}+2\frac{bc'^2d}{ac^3}\right.$$

$$-\frac{a''bd}{a^2c}-2\frac{a'b'd}{a^2c}-2\frac{a'bd'}{a^2c}+2\frac{a'^2bd}{a^3c}+2\frac{a'bc'd}{a^2c^2}$$

$$-\frac{a''c}{bd}-2\frac{a'c'}{bd}-\frac{ac''}{bd}+\frac{acd''}{bd^2}+2\frac{a'cd'}{bd^2}+2\frac{ac'd'}{bd^2}-2\frac{acd'^2}{bd^3}$$

$$\left.+\frac{ab''c}{b^2d}+2\frac{a'b'c}{b^2d}+2\frac{ab'c'}{b^2d}-2\frac{ab'^2c}{b^3d}-2\frac{ab'cd'}{b^2d^2}\right)$$

$$+v\frac{d^3}{dv^3}\left(\frac{bd}{ac}-\frac{ac}{bd}\right)$$

From above we have known the third derivation $\frac{d^3}{dv^3}\left[\left(\frac{ac}{b}+\frac{bd}{a}\right)(\varphi_3=)\right]$ is very complicated. However, later in the appendix XII count the approximate value of $\lambda$ when $v\to 0$ we will see, because the coefficients of $(v/C)$, of $(v/C)^2$, of $(v/C)^3$, of $(v/C)^4$, of $(v/C)^5$ are all counteracted, we have to count the other derivation till the $\frac{d^6}{dv^6}\left[\left(\frac{ac}{b}+\frac{bd}{a}\right)(\varphi_3=)\right]$. Although it is very very complicated and hardship, we have no alternative but continue ——

The fourth derivation $\frac{d^4}{dv^4}\left[\left(\frac{ac}{b}+\frac{bd}{a}\right)(\varphi_3=)\right]$ is

$$5④:\varphi_3''''\cdot\left(\frac{ac}{b}+\frac{bd}{a}\right)+4\varphi_3'''\cdot\left(\frac{a'c}{b}+\frac{ac'}{b}-\frac{acb'}{b^2}+\frac{b'd}{a}+\frac{bd'}{a}-\frac{a'bd}{a^2}\right)$$

$$+6\varphi_3''\left(\frac{a''c}{b}+2\frac{a'c'}{b}+\frac{ac''}{b}-\frac{ab''c}{b^2}-2\frac{ab'c'}{b^2}-2\frac{a'b'c}{b^2}+2\frac{ab'^2c}{b^3}\right.$$

$$\left.+\frac{b''d}{a}+2\frac{b'd'}{a}+\frac{bd''}{a}-\frac{a''bd}{a^2}-2\frac{a'b'd}{a^2}-2\frac{a'bd'}{a^2}+2\frac{a'^2bd}{a^3}\right)$$

$$+4\varphi_3'\left(\frac{a'''c}{b}+\frac{ac'''}{b}+3\frac{a''c'}{b}+3\frac{a'c''}{b}-\frac{ab'''c}{b^2}-3\frac{a''b'c}{b^2}-3\frac{a'b''c}{b^2}-3\frac{ab''c'}{b^2}-3\frac{ab'c''}{b^2}\right.$$

$$-6\frac{a'b'c'}{b^2}+6\frac{a'b'^2c}{b^3}+6\frac{ab'^2c'}{b^3}+6\frac{ab'b''c}{b^3}-6\frac{ab'^3c}{b^4}$$

$$+\frac{b'''d}{a}+\frac{bd'''}{a}+3\frac{b''d'}{a}+3\frac{b'd''}{a}-\frac{a'''bd}{a^2}-3\frac{a''b'd}{a^2}-3\frac{a'b''d}{a^2}-3\frac{a'bd''}{a^2}-3\frac{a''bd'}{a^2}$$

$$\left.-6\frac{a'b'd'}{a^2}+6\frac{a'^2bd'}{a^3}+6\frac{a'^2b'd}{a^3}+6\frac{a'a''bd}{a^3}-6\frac{a'^3bd}{a^4}\right)$$

$$+\varphi_3\left(\frac{a''''c}{b}+\frac{a'''c'}{b}-\frac{a'''b'c}{b^2}+\frac{a'c'''}{b}+\frac{ac''''}{b}-\frac{ab'c'''}{b^2}+3\frac{a'''c'}{b}+3\frac{a''c''}{b}-3\frac{a''b'c'}{b^2}\right.$$

$$+3\frac{a''c''}{b}+3\frac{a'c'''}{b}-3\frac{a'b'c''}{b^2}-\frac{a'b'''c}{b^2}-\frac{ab''''c}{b^2}-\frac{ab'''c'}{b^2}+2\frac{ab'b'''c}{b^3}$$

$$-3\frac{a'''b'c}{b^2}-3\frac{a''b''c}{b^2}-3\frac{a''b'c'}{b^2}+6\frac{a''b'^2c}{b^3}-3\frac{a''b''c}{b^2}-3\frac{a'b'''c}{b^2}-3\frac{a'b''c'}{b^2}+6\frac{a'b'b''c}{b^3}$$

$$-3\frac{a'b''c'}{b^2}-3\frac{ab'''c'}{b^2}-3\frac{ab''c''}{b^2}+6\frac{ab'b''c'}{b^3}-3\frac{a'b'c''}{b^2}-3\frac{ab''c''}{b^2}-3\frac{ab'c'''}{b^2}+6\frac{ab'^2c''}{b^3}$$

$$-6\frac{a''b'c'}{b^2}-6\frac{a'b''c'}{b^2}-6\frac{a'b'c''}{b^2}+12\frac{a'b'^2c'}{b^3}+6\frac{a''b'^2c}{b^3}+12\frac{a'b'b''c}{b^3}+6\frac{a'b'^2c'}{b^3}-18\frac{a'b'^3c}{b^4}$$

$$+6\frac{a'b'^2c'}{b^3}+12\frac{ab'b''c'}{b^3}+6\frac{ab'^2c''}{b^3}-18\frac{ab'^3c'}{b^4}$$

$$+6\frac{a'b'b''c}{b^3}+6\frac{ab''^2c}{b^3}+6\frac{ab'b'''c}{b^3}+6\frac{ab'b''c'}{b^3}-18\frac{ab'^2b''c}{b^4}$$

$$-6\frac{a'b'^3c}{b^4}-18\frac{ab'^2b''c}{b^4}-6\frac{ab'^3c'}{b^4}+24\frac{ab'^4c}{b^5}$$

$$+\frac{b''''d}{a}+\frac{b'''d'}{a}-\frac{a'b'''d}{a^2}+\frac{b'd'''}{a}+\frac{bd''''}{a}-\frac{a'bd'''}{a^2}+3\frac{b'''d'}{a}+3\frac{b''d''}{a}-3\frac{a'b''d'}{a^2}$$

$$+3\frac{b''d''}{a}+3\frac{b'd'''}{a}-3\frac{a'b'd''}{a^2}-\frac{a''''bd}{a^2}-\frac{a'''b'd}{a^2}-\frac{a'''bd'}{a^2}+2\frac{a'a'''bd}{a^3}$$

$$-3\frac{a'''b'd}{a^2}-3\frac{a''b''d}{a^2}-3\frac{a''b'd'}{a^2}+6\frac{a'a''b'd}{a^3}-3\frac{a''b''d}{a^2}-3\frac{a'b'''d}{a^2}-3\frac{a'b''d'}{a^2}+6\frac{a'^2b''d}{a^3}$$

$$-3\frac{a''bd''}{a^2}-3\frac{a'b'd''}{a^2}-3\frac{a'bd'''}{a^2}+6\frac{a'^2bd''}{a^3}-3\frac{a'''bd'}{a^2}-3\frac{a''b'd'}{a^2}-3\frac{a''bd''}{a^2}+6\frac{a'a''bd'}{a^3}$$

$$-6\frac{a''b'd'}{a^2}-6\frac{a'b''d'}{a^2}-6\frac{a'b'd''}{a^2}+12\frac{a'^2b'd'}{a^3}$$

$$+12\frac{a'a''b'd}{a^3}+6\frac{a'^2b''d}{a^3}+6\frac{a'^2b'd'}{a^3}-18\frac{a'^3b'd}{a^4}$$

$$+12\frac{a'a''bd'}{a^3}+6\frac{a'^2b'd'}{a^3}+6\frac{a'^2bd''}{a^3}-18\frac{a'^3bd'}{a^4}$$

$$+6\frac{a''^2bd}{a^3}+6\frac{a'a'''bd}{a^3}+6\frac{a'a''b'd}{a^3}+6\frac{a'a''bd'}{a^3}-18\frac{a'^2a''bd}{a^4}$$

$$\left.-18\frac{a'^2a''bd}{a^4}-6\frac{a'^3b'd}{a^4}-6\frac{a'^3bd'}{a^4}+24\frac{a'^4bd}{a^5}\right)$$

$$=\left(\frac{a''''c}{d}+\frac{a'''c'}{d}-\frac{a'''cd'}{d^2}+\frac{a'c'''}{d}+\frac{ac''''}{d}-\frac{ac'''d'}{d^2}+3\frac{a'''c'}{d}+3\frac{a''c''}{d}-3\frac{a''c'd'}{d^2}\right.$$

$$+3\frac{a''c''}{d}+3\frac{a'c'''}{d}-3\frac{a'c''d'}{d^2}-\frac{a'cd'''}{d^2}-\frac{ac'd'''}{d^2}-\frac{acd''''}{d^2}+2\frac{acd'd'''}{d^3}$$

$$-3\frac{a'''cd'}{d^2}-3\frac{a''c'd'}{d^2}-3\frac{a''cd''}{d^2}+6\frac{a''cd'^2}{d^3}-3\frac{a'c''d'}{d^2}-3\frac{ac'''d'}{d^2}-3\frac{ac''d''}{d^2}+6\frac{ac''d'^2}{d^3}$$

$$-3\frac{a''cd''}{d^2}-3\frac{a'c'd''}{d^2}-3\frac{a'cd'''}{d^2}+6\frac{a'cd'd''}{d^3}-3\frac{a'c'd''}{d^2}-3\frac{ac''d''}{d^2}-3\frac{ac'd'''}{d^2}+6\frac{ac'd'd''}{d^3}$$

$$-6\frac{a''c'd'}{d^2}-6\frac{a'c''d'}{d^2}-6\frac{a'c'd''}{d^2}+12\frac{a'c'd'^2}{d^3}+6\frac{a'c'd'^2}{d^3}+6\frac{ac''d'^2}{d^3}+12\frac{ac'd'd''}{d^3}-18\frac{ac'd'^3}{d^4}$$

$$+6\frac{a''cd'^2}{d^3}+6\frac{a'c'd'^2}{d^3}+12\frac{a'cd'd''}{d^3}-18\frac{a'cd'^3}{d^4}$$

$$+6\frac{a'cd'd''}{d^3}+6\frac{ac'd'd''}{d^3}+6\frac{acd''^2}{d^3}+6\frac{acd'd'''}{d^3}-18\frac{acd'^2d''}{d^4}$$

$$\left.-6\frac{a'cd'^3}{d^4}-6\frac{ac'd'^3}{d^4}-18\frac{acd'^2d''}{d^4}+24\frac{acd'^4}{d^5}\right)$$

$$+\left(\frac{b''''d}{c}+\frac{b'''d'}{c}-\frac{b'''c'd}{c^2}+\frac{b'd'''}{c}+\frac{bd''''}{c}-\frac{bc'd'''}{c^2}+3\frac{b'''d'}{c}+3\frac{b''d''}{c}-3\frac{b''c'd'}{c^2}\right.$$

$$+3\frac{b''d''}{c}+3\frac{b'd'''}{c}-3\frac{b'c'd''}{c^2}-\frac{b'c'''d}{c^2}-\frac{bc''''d}{c^2}-\frac{bc'''d'}{c^2}+2\frac{bc'c'''d}{c^3}$$

$$-3\frac{b'''c'd}{c^2}-3\frac{b''c''d}{c^2}-3\frac{b''c'd'}{c^2}+6\frac{b''c'^2d}{c^3}-3\frac{b''c''d}{c^2}-3\frac{b'c'''d}{c^2}-3\frac{b'c''d'}{c^2}+6\frac{b'c'c''d}{c^3}$$

$$-3\frac{b'c'd''}{c^2}-3\frac{bc''d''}{c^2}-3\frac{bc'd'''}{c^2}+6\frac{bc'^2d''}{c^3}-3\frac{b'c''d'}{c^2}-3\frac{bc'''d'}{c^2}-3\frac{bc''d''}{c^2}+6\frac{bc'c''d'}{c^3}$$

$$-6\frac{b''c'd'}{c^2}-6\frac{b'c''d'}{c^2}-6\frac{b'c'd''}{c^2}+12\frac{b'c'^2d'}{c^3}+6\frac{b''c'^2d}{c^3}+12\frac{b'c'c''d}{c^3}+6\frac{b'c'^2d'}{c^3}-18\frac{b'c'^3d}{c^4}$$

$$+6\frac{b'c'^2d'}{c^3}+12\frac{bc'c''d'}{c^3}+6\frac{bc'^2d''}{c^3}-18\frac{bc'^3d'}{c^4}$$

$$+6\frac{b'c'c''d}{c^3}+6\frac{bc''^2d}{c^3}+6\frac{bc'c'''d}{c^3}+6\frac{bc'c''d'}{c^3}-18\frac{bc'^2c''d}{c^4}$$

$$\left.-6\frac{b'c'^3d}{c^4}-18\frac{bc'^2c''d}{c^4}-6\frac{bc'^3d'}{c^4}+24\frac{bc'^4d}{c^5}\right)$$

$$+4\left(\frac{b'''d}{ac}+\frac{b''d'}{ac}-\frac{a'b''d}{a^2c}-\frac{b''c'd}{ac^2}+2\frac{b''d'}{ac}+2\frac{b'd''}{ac}-2\frac{a'b'd'}{a^2c}-2\frac{b'c'd'}{ac^2}\right.$$

$$+\frac{b'd''}{ac}+\frac{bd'''}{ac}-\frac{a'bd''}{a^2c}-\frac{bc'd''}{ac^2}-\frac{b'c''d}{ac^2}-\frac{bc'''d}{ac^2}-\frac{bc''d'}{ac^2}+\frac{a'bc''d}{a^2c^2}+2\frac{bc'c''d}{ac^3}$$

$$-2\frac{b''c'd}{ac^2}-2\frac{b'c''d}{ac^2}-2\frac{b'c'd'}{ac^2}+2\frac{a'b'c'd}{a^2c^2}+4\frac{b'c'^2d}{ac^3}-2\frac{b'c'd'}{ac^2}-2\frac{bc''d'}{ac^2}-2\frac{bc'd''}{ac^2}$$

$$+2\frac{a'bc'd'}{a^2c^2}+4\frac{bc'^2d'}{ac^3}+2\frac{b'c'^2d}{ac^3}+4\frac{bc'c''d}{ac^3}+2\frac{bc'^2d'}{ac^3}-2\frac{a'bc'^2d}{a^2c^3}-6\frac{bc'^3d}{ac^4}$$

$$-\frac{a'''bd}{a^2c}-\frac{a''b'd}{a^2c}-\frac{a''bd'}{a^2c}+2\frac{a'a''bd}{a^3c}+\frac{a''bc'd}{a^2c^2}-2\frac{a''b'd}{a^2c}-2\frac{a'b''d}{a^2c}-2\frac{a'b'd'}{a^2c}+4\frac{a'^2b'd}{a^3c}$$

$$+2\frac{a'b'c'd}{a^2c^2}-2\frac{a''bd'}{a^2c}-2\frac{a'b'd'}{a^2c}-2\frac{a'bd''}{a^2c}+4\frac{a'^2bd'}{a^3c}+2\frac{a'bc'd'}{a^2c^2}$$

$$+4\frac{a'a''bd}{a^3c}+2\frac{a'^2b'd}{a^3c}+2\frac{a'^2bd'}{a^3c}-6\frac{a'^3bd}{a^4c}-2\frac{a'^2bc'd}{a^3c^2}$$

$$+2\frac{a''bc'd}{a^2c^2}+2\frac{a'b'c'd}{a^2c^2}+2\frac{a'bc''d}{a^2c^2}+2\frac{a'bc'd'}{a^2c^2}-4\frac{a'^2bc'd}{a^3c^2}-4\frac{a'bc'^2d}{a^2c^3}$$

$$-\frac{a'''c}{bd}-\frac{a''c'}{bd}+\frac{a''b'c}{b^2d}+\frac{a''cd'}{bd^2}-2\frac{a''c'}{bd}-2\frac{a'c''}{bd}+2\frac{a'b'c'}{b^2d}+2\frac{a'c'd'}{bd^2}$$

$$-\frac{a'c''}{bd}-\frac{ac'''}{bd}+\frac{ab'c''}{b^2d}+\frac{ac''d'}{bd^2}+\frac{a'cd''}{bd^2}+\frac{ac'd''}{bd^2}+\frac{acd'''}{bd^2}-\frac{ab'cd''}{b^2d^2}-2\frac{acd'd''}{bd^3}$$

$$+2\frac{a''cd'}{bd^2}+2\frac{a'c'd'}{bd^2}+2\frac{a'cd''}{bd^2}-2\frac{a'b'cd'}{b^2d^2}-4\frac{a'cd'^2}{bd^3}$$

$$+2\frac{a'c'd'}{bd^2}+2\frac{ac''d'}{bd^2}+2\frac{ac'd''}{bd^2}-2\frac{ab'c'd'}{b^2d^2}-4\frac{ac'd'^2}{bd^3}$$

$$-2\frac{a'cd'^2}{bd^3}-2\frac{ac'd'^2}{bd^3}-4\frac{acd'd''}{bd^3}+2\frac{ab'cd'^2}{b^2d^3}+6\frac{acd'^3}{bd^4}$$

$$+\frac{a'b''c}{b^2d}+\frac{ab'''c}{b^2d}+\frac{ab''c'}{b^2d}-2\frac{ab'b''c}{b^3d}-\frac{ab''cd'}{b^2d^2}$$

$$+2\frac{a''b'c}{b^2d}+2\frac{a'b''c}{b^2d}+2\frac{a'b'c'}{b^2d}-4\frac{a'b'^2c}{b^3d}-2\frac{a'b'cd'}{b^2d^2}$$

$$+2\frac{a'b'c'}{b^2d}+2\frac{ab''c'}{b^2d}+2\frac{ab'c''}{b^2d}-4\frac{ab'^2c'}{b^3d}-2\frac{ab'c'd'}{b^2d^2}$$

$$-2\frac{a'b'^2c}{b^3d}-4\frac{ab'b''c}{b^3d}-2\frac{ab'^2c'}{b^3d}+6\frac{ab'^3c}{b^4d}+2\frac{ab'^2cd'}{b^3d^2}$$

$$-2\frac{a'b'cd'}{b^2d^2}-2\frac{ab''cd'}{b^2d^2}-2\frac{ab'c'd'}{b^2d^2}-2\frac{ab'cd''}{b^2d^2}+4\frac{ab'^2cd'}{b^3d^2}+4\frac{ab'cd'^2}{b^2d^3}\Bigg)$$

$$+v\frac{d^4}{dv^4}\left(\frac{bd}{ac}-\frac{ac}{bd}\right)$$

Merging the same kind term the 5④ becomes

$$\varphi_3''''\cdot\left(\frac{ac}{b}+\frac{bd}{a}\right)+4\varphi_3'''\cdot\left(\frac{a'c}{b}+\frac{ac'}{b}-\frac{acb'}{b^2}+\frac{b'd}{a}+\frac{bd'}{a}-\frac{a'bd}{a^2}\right)$$

$$+6\varphi_3''\Bigg(\frac{a''c}{b}+2\frac{a'c'}{b}+\frac{ac''}{b}-\frac{ab''c}{b^2}-2\frac{ab'c'}{b^2}-2\frac{a'b'c}{b^2}+2\frac{ab'^2c}{b^3}$$

$$+\frac{b''d}{a}+2\frac{b'd'}{a}+\frac{bd''}{a}-\frac{a''bd}{a^2}-2\frac{a'b'd}{a^2}-2\frac{a'bd'}{a^2}+2\frac{a'^2bd}{a^3}\Bigg)$$

$$+4\varphi_3'\Bigg(\frac{a'''c}{b}+\frac{ac'''}{b}+3\frac{a''c'}{b}+3\frac{a'c''}{b}-\frac{ab'''c}{b^2}-3\frac{a''b'c}{b^2}-3\frac{a'b''c}{b^2}-3\frac{ab''c'}{b^2}-3\frac{ab'c''}{b^2}$$

$$-6\frac{a'b'c'}{b^2}+6\frac{a'b'^2c}{b^3}+6\frac{ab'^2c'}{b^3}+6\frac{ab'b''c}{b^3}-6\frac{ab'^3c}{b^4}$$

$$+\frac{b'''d}{a}+\frac{bd'''}{a}+3\frac{b''d'}{a}+3\frac{b'd''}{a}-\frac{a'''bd}{a^2}-3\frac{a''b'd}{a^2}-3\frac{a'b''d}{a^2}-3\frac{a'bd''}{a^2}-3\frac{a''bd'}{a^2}$$

$$\left.-6\frac{a'b'd'}{a^2}+6\frac{a'^2bd'}{a^3}+6\frac{a'^2b'd}{a^3}+6\frac{a'a''bd}{a^3}-6\frac{a'^3bd}{a^4}\right)$$

$$+\varphi_3\left(\frac{a''''c}{b}+\frac{ac''''}{b}+4\frac{a'''c'}{b}+4\frac{a'c'''}{b}+6\frac{a''c''}{b}-12\frac{a''b'c'}{b^2}-12\frac{a'b''c'}{b^2}-12\frac{a'b'c''}{b^2}\right.$$

$$-4\frac{a'b'''c}{b^2}-4\frac{ab'''c'}{b^2}-4\frac{ab'c'''}{b^2}-4\frac{a'''b'c}{b^2}-\frac{ab''''c}{b^2}-6\frac{a''b''c}{b^2}-6\frac{ab''c''}{b^2}+6\frac{ab''^2c}{b^3}$$

$$+12\frac{a''b'^2c}{b^3}+12\frac{ab'^2c''}{b^3}+24\frac{a'b'^2c'}{b^3}-24\frac{a'b'^3c}{b^4}-24\frac{ab'^3c'}{b^4}+24\frac{ab'b''c'}{b^3}+24\frac{a'b'b''c}{b^3}$$

$$+8\frac{ab'b'''c}{b^3}-36\frac{ab'^2b''c}{b^4}+24\frac{ab'^4c}{b^5}$$

$$+\frac{b''''d}{a}+\frac{bd''''}{a}+4\frac{b'''d'}{a}+4\frac{b'd'''}{a}+6\frac{b''d''}{a}-12\frac{a''b'd'}{a^2}-12\frac{a'b''d'}{a^2}-12\frac{a'b'd''}{a^2}$$

$$-4\frac{a'''bd'}{a^2}-4\frac{a'bd'''}{a^2}-4\frac{a'''b'd}{a^2}-4\frac{a'b'''d}{a^2}-\frac{a''''bd}{a^2}-6\frac{a''b''d}{a^2}-6\frac{a''bd''}{a^2}+6\frac{a''^2bd}{a^3}$$

$$+12\frac{a'^2bd''}{a^3}+12\frac{a'^2b''d}{a^3}+24\frac{a'^2b'd'}{a^3}-24\frac{a'^3b'd}{a^4}-24\frac{a'^3bd'}{a^4}+24\frac{a'a''b'd}{a^3}+24\frac{a'a''bd'}{a^3}$$

$$\left.+8\frac{a'a'''bd}{a^3}-36\frac{a'^2a''bd}{a^4}+24\frac{a'^4bd}{a^5}\right)$$

$$=\left(\frac{a''''c}{d}+\frac{ac''''}{d}+4\frac{a'''c'}{d}+4\frac{a'c'''}{d}+6\frac{a''c''}{d}-6\frac{a''cd''}{d^2}-6\frac{ac''d''}{d^2}-4\frac{a'cd'''}{d^2}-4\frac{ac'd'''}{d^2}\right.$$

$$-4\frac{a'''cd'}{d^2}-4\frac{ac'''d'}{d^2}-12\frac{a''c'd'}{d^2}-12\frac{a'c''d'}{d^2}-12\frac{a'c'd''}{d^2}-\frac{acd''''}{d^2}+6\frac{acd''^2}{d^3}+8\frac{acd'd'''}{d^3}$$

$$+12\frac{ac''d'^2}{d^3}+12\frac{a''cd'^2}{d^3}+24\frac{a'c'd'^2}{d^3}+24\frac{a'cd'd''}{d^3}+24\frac{ac'd'd''}{d^3}$$

$$\left.-36\frac{acd'^2d''}{d^4}-24\frac{ac'd'^3}{d^4}-24\frac{a'cd'^3}{d^4}+24\frac{acd'^4}{d^5}\right)$$

$$+\left(\frac{b''''d}{c}+\frac{bd''''}{c}+4\frac{b'''d'}{c}+4\frac{b'd'''}{c}+6\frac{b''d''}{c}-6\frac{b''c''d}{c^2}-6\frac{bc''d''}{c^2}-4\frac{b'''c'd}{c^2}-4\frac{b'c'''d}{c^2}\right.$$

$$-4\frac{bc'd'''}{c^2}-4\frac{bc'''d'}{c^2}-12\frac{b''c'd'}{c^2}-12\frac{b'c''d'}{c^2}-12\frac{b'c'd''}{c^2}-\frac{bc''''d}{c^2}+6\frac{bc''^2d}{c^3}+8\frac{bc'c'''d}{c^3}$$

$$+12\frac{b''c'^2d}{c^3}+12\frac{bc'^2d''}{c^3}+24\frac{b'c'^2d'}{c^3}+24\frac{b'c'c''d}{c^3}+24\frac{bc'c''d'}{c^3}$$

$$\left.-36\frac{bc'^2c''d}{c^4}-24\frac{b'c'^3d}{c^4}-24\frac{bc'^3d'}{c^4}+24\frac{bc'^4d}{c^5}\right)$$

$$+4\left(\frac{b'''d}{ac}+\frac{bd'''}{ac}+3\frac{b''d'}{ac}+3\frac{b'd''}{ac}-3\frac{b''c'd}{ac^2}-6\frac{b'c'd'}{ac^2}-3\frac{bc'd''}{ac^2}-3\frac{b'c''d}{ac^2}-3\frac{bc''d'}{ac^2}-\frac{bc'''d}{ac^2}\right.$$

$$+6\frac{bc'c''d}{ac^3}+6\frac{b'c'^2d}{ac^3}+6\frac{bc'^2d'}{ac^3}-6\frac{bc'^3d}{ac^4}-\frac{a'''bd}{a^2c}-3\frac{a''bd'}{a^2c}-3\frac{a''b'd}{a^2c}-3\frac{a'b''d}{a^2c}-3\frac{a'bd''}{a^2c}$$

$$-6\frac{a'b'd'}{a^2c}+3\frac{a'bc''d}{a^2c^2}+3\frac{a''bc'd}{a^2c^2}+6\frac{a'b'c'd}{a^2c^2}+6\frac{a'bc'd'}{a^2c^2}-6\frac{a'bc'^2d}{a^2c^3}+6\frac{a'a''bd}{a^3c}+6\frac{a'^2b'd}{a^3c}$$

$$+6\frac{a'^2bd'}{a^3c}-6\frac{a'^2bc'd}{a^3c^2}-6\frac{a'^3bd}{a^4c}$$

$$-\frac{a'''c}{bd}-\frac{ac'''}{bd}-3\frac{a''c'}{bd}-3\frac{a'c''}{bd}+3\frac{a''cd'}{bd^2}+6\frac{a'c'd'}{bd^2}+3\frac{ac''d'}{bd^2}+3\frac{a'cd''}{bd^2}+3\frac{ac'd''}{bd^2}+\frac{acd'''}{bd^2}$$

$$-6\frac{acd'd''}{bd^3}-6\frac{a'cd'^2}{bd^3}-6\frac{ac'd'^2}{bd^3}+6\frac{acd'^3}{bd^4}+\frac{ab'''c}{b^2d}+3\frac{ab''c'}{b^2d}+3\frac{a''b'c}{b^2d}+3\frac{a'b''c}{b^2d}+3\frac{ab'c''}{b^2d}$$

$$+6\frac{a'b'c'}{b^2d}-3\frac{ab'cd''}{b^2d^2}-3\frac{ab''cd'}{b^2d^2}-6\frac{ab'c'd'}{b^2d^2}-6\frac{a'b'cd'}{b^2d^2}+6\frac{ab'cd'^2}{b^2d^3}-6\frac{ab'b''c}{b^3d}-6\frac{a'b'^2c}{b^3d}$$

$$\left.-6\frac{ab'^2c'}{b^3d}+6\frac{ab'^2cd'}{b^3d^2}+6\frac{ab'^3c}{b^4d}\right)+v\frac{d^4}{dv^4}\left(\frac{bd}{ac}-\frac{ac}{bd}\right)$$

The fifth derivation $\frac{d^5}{dv^5}\left[\left(\frac{ac}{b}+\frac{bd}{a}\right)(\varphi_3=)\right]$ is 5⑤:

$$\varphi_3''''' \left(\frac{ac}{b}+\frac{bd}{a}\right)+5\varphi_3''''\cdot\left(\frac{a'c}{b}+\frac{ac'}{b}-\frac{acb'}{b^2}+\frac{b'd}{a}+\frac{bd'}{a}-\frac{a'bd}{a^2}\right)$$

$$+10\varphi_3'''\cdot\left(\frac{a''c}{b}+2\frac{a'c'}{b}+\frac{ac''}{b}-\frac{ab''c}{b^2}-2\frac{ab'c'}{b^2}-2\frac{a'b'c}{b^2}+2\frac{ab'^2c}{b^3}\right.$$

$$\left.+\frac{b''d}{a}+2\frac{b'd'}{a}+\frac{bd''}{a}-\frac{a''bd}{a^2}-2\frac{a'b'd}{a^2}-2\frac{a'bd'}{a^2}+2\frac{a'^2bd}{a^3}\right)$$

$$+10\varphi_3''\left(\frac{a'''c}{b}+\frac{ac'''}{b}+3\frac{a''c'}{b}+3\frac{a'c''}{b}-\frac{ab'''c}{b^2}-3\frac{a''b'c}{b^2}-3\frac{a'b''c}{b^2}-3\frac{ab''c'}{b^2}-3\frac{ab'c''}{b^2}\right.$$

$$-6\frac{a'b'c'}{b^2}+6\frac{a'b'^2c}{b^3}+6\frac{ab'^2c'}{b^3}+6\frac{ab'b''c}{b^3}-6\frac{ab'^3c}{b^4}$$

$$+\frac{b'''d}{a}+\frac{bd'''}{a}+3\frac{b''d'}{a}+3\frac{b'd''}{a}-\frac{a'''bd}{a^2}-3\frac{a''b'd}{a^2}-3\frac{a'b''d}{a^2}-3\frac{a'bd''}{a^2}-3\frac{a''bd'}{a^2}$$

$$\left.-6\frac{a'b'd'}{a^2}+6\frac{a'^2bd'}{a^3}+6\frac{a'^2b'd}{a^3}+6\frac{a'a''bd}{a^3}-6\frac{a'^3bd}{a^4}\right)$$

$$+5\varphi_3'\Bigg(\frac{a''''c}{b}+\frac{ac''''}{b}+4\frac{a'''c'}{b}+4\frac{a'c'''}{b}+6\frac{a''c''}{b}-12\frac{a''b'c'}{b^2}-12\frac{a'b''c'}{b^2}-12\frac{a'b'c''}{b^2}$$

$$-4\frac{a'b'''c}{b^2}-4\frac{ab'''c'}{b^2}-4\frac{ab'c'''}{b^2}-4\frac{a'''b'c}{b^2}-\frac{ab''''c}{b^2}-6\frac{a''b''c}{b^2}-6\frac{ab''c''}{b^2}+6\frac{ab''^2c}{b^3}$$

$$+12\frac{a''b'^2c}{b^3}+12\frac{ab'^2c''}{b^3}+24\frac{a'b'^2c'}{b^3}-24\frac{a'b'^3c}{b^4}-24\frac{ab'^3c'}{b^4}+24\frac{ab'b''c'}{b^3}+24\frac{a'b'b''c}{b^3}$$

$$+8\frac{ab'b'''c}{b^3}-36\frac{ab'^2b''c}{b^4}+24\frac{ab'^4c}{b^5}$$

$$+\frac{b''''d}{a}+\frac{bd''''}{a}+4\frac{b'''d'}{a}+4\frac{b'd'''}{a}+6\frac{b''d''}{a}-12\frac{a''b'd'}{a^2}-12\frac{a'b''d'}{a^2}-12\frac{a'b'd''}{a^2}$$

$$-4\frac{a'''bd'}{a^2}-4\frac{a'bd'''}{a^2}-4\frac{a'''b'd}{a^2}-4\frac{a'b'''d}{a^2}-\frac{a''''bd}{a^2}-6\frac{a''b''d}{a^2}-6\frac{a''bd''}{a^2}+6\frac{a''^2bd}{a^3}$$

$$+12\frac{a'^2bd''}{a^3}+12\frac{a'^2b''d}{a^3}+24\frac{a'^2b'd'}{a^3}-24\frac{a'^3b'd}{a^4}-24\frac{a'^3bd'}{a^4}+24\frac{a'a''b'd}{a^3}+24\frac{a'a''bd'}{a^3}$$

$$+8\frac{a'a'''bd}{a^3}-36\frac{a'^2a''bd}{a^4}+24\frac{a'^4bd}{a^5}\Bigg)$$

$$+\varphi_3\Bigg(+\frac{a'''''c}{b}+\frac{a''''c'}{b}-\frac{a''''b'c}{b^2}+\frac{a'c''''}{b}+\frac{ac'''''}{b}-\frac{ab'c''''}{b^2}+4\frac{a''''c'}{b}+4\frac{a'''c''}{b}-4\frac{a'''b'c'}{b^2}$$

$$+4\frac{a''c'''}{b}+4\frac{a'c''''}{b}-4\frac{a'b'c'''}{b^2}+6\frac{a'''c''}{b}+6\frac{a''c'''}{b}-6\frac{a''b'c''}{b^2}-12\frac{a'''b'c'}{b^2}-12\frac{a''b''c'}{b^2}$$

$$-12\frac{a''b'c''}{b^2}+24\frac{a''b'^2c'}{b^3}-12\frac{a''b''c'}{b^2}-12\frac{a'b'''c'}{b^2}-12\frac{a'b''c''}{b^2}+24\frac{a'b'b''c'}{b^3}-12\frac{a''b'c''}{b^2}$$

$$-12\frac{a'b''c''}{b^2}-12\frac{a'b'c'''}{b^2}+24\frac{a'b'^2c''}{b^3}-4\frac{a''b'''c}{b^2}-4\frac{a'b''''c}{b^2}-4\frac{a'b'''c'}{b^2}+8\frac{a'b'b'''c}{b^3}$$

$$-4\frac{a'b'''c'}{b^2}-4\frac{ab''''c'}{b^2}-4\frac{ab'''c''}{b^2}+8\frac{ab'b'''c'}{b^3}-4\frac{a'b'c'''}{b^2}-4\frac{ab''c'''}{b^2}-4\frac{ab'c''''}{b^2}+8\frac{ab'^2c'''}{b^3}$$

$$-4\frac{a''''b'c}{b^2}-4\frac{a'''b''c}{b^2}-4\frac{a'''b'c'}{b^2}+8\frac{a'''b'^2c}{b^3}-\frac{a'b''''c}{b^2}-\frac{ab'''''c}{b^2}-\frac{ab''''c'}{b^2}+2\frac{ab'b''''c}{b^3}$$

$$-6\frac{a'''b''c}{b^2}-6\frac{a''b'''c}{b^2}-6\frac{a''b''c'}{b^2}+12\frac{a''b'b''c}{b^3}-6\frac{a'b''c''}{b^2}-6\frac{ab'''c''}{b^2}-6\frac{ab''c'''}{b^2}+12\frac{ab'b''c''}{b^3}$$

$$+6\frac{a'b''^2c}{b^3}+12\frac{ab''b'''c}{b^3}+6\frac{ab''^2c'}{b^3}-18\frac{ab'b''^2c}{b^4}+12\frac{a'''b'^2c}{b^3}+24\frac{a''b'b''c}{b^3}+12\frac{a''b'^2c'}{b^3}$$

$$-36\frac{a''b'^3c}{b^4}+12\frac{a'b'^2c''}{b^3}+24\frac{ab'b''c''}{b^3}+12\frac{ab'^2c'''}{b^3}-36\frac{ab'^3c''}{b^4}+24\frac{a''b'^2c'}{b^3}+48\frac{a'b'b''c'}{b^3}$$

$$+24\frac{a'b'^2c''}{b^3}-24\cdot 3\frac{a'b'^3c'}{b^4}-24\frac{a''b'^3c}{b^4}-24\cdot 3\frac{a'b'^2b''c}{b^4}-24\frac{a'b'^3c'}{b^4}+24\cdot 4\frac{a'b'^4c}{b^5}$$

$$-24\frac{a'b'^3c'}{b^4}-24\cdot 3\frac{ab'^2b''c'}{b^4}-24\frac{ab'^3c''}{b^4}+24\cdot 4\frac{ab'^4c'}{b^5}+24\frac{a'b'b''c'}{b^3}+24\frac{ab''^2c'}{b^3}$$

$$+24\frac{ab'b'''c'}{b^3}+24\frac{ab'b''c''}{b^3}-24\cdot 3\frac{ab'^2b''c'}{b^4}+24\frac{a''b'b''c}{b^3}+24\frac{a'b''^2c}{b^3}+24\frac{a'b'b'''c}{b^3}$$

$$+24\frac{a'b'b''c'}{b^3}-24\cdot 3\frac{a'b'^2b''c}{b^4}+8\frac{a'b'b'''c}{b^3}+8\frac{ab''b'''c}{b^3}+8\frac{ab'b''''c}{b^3}+8\frac{ab'b'''c'}{b^3}-24\frac{ab'^2b'''c}{b^4}$$

$$-36\frac{a'b'^2b''c}{b^4}-72\frac{ab'b''^2c}{b^4}-36\frac{ab'^2b'''c}{b^4}-36\frac{ab'^2b''c'}{b^4}+36\cdot 4\frac{ab'^3b''c}{b^5}$$

$$+24\frac{a'b'^4c}{b^5}+24\cdot 4\frac{ab'^3b''c}{b^5}+24\frac{ab'^4c'}{b^5}-24\cdot 5\frac{ab'^5c}{b^6}$$

$$+\frac{b'''''d}{a}+\frac{b''''d'}{a}-\frac{a'b''''d}{a^2}+\frac{b'd''''}{a}+\frac{bd'''''}{a}-\frac{a'bd''''}{a^2}+4\frac{b''''d'}{a}+4\frac{b'''d''}{a}-4\frac{a'b'''d'}{a^2}$$

$$+4\frac{b''d'''}{a}+4\frac{b'd''''}{a}-4\frac{a'b'd'''}{a^2}+6\frac{b'''d''}{a}+6\frac{b''d'''}{a}-6\frac{a'b''d''}{a^2}-12\frac{a'''b'd'}{a^2}-12\frac{a''b''d'}{a^2}$$

$$-12\frac{a''b'd''}{a^2}+24\frac{a'a''b'd'}{a^3}-12\frac{a''b''d'}{a^2}-12\frac{a'b'''d'}{a^2}-12\frac{a'b''d''}{a^2}+24\frac{a'^2b''d'}{a^3}-12\frac{a''b'd''}{a^2}$$

$$-12\frac{a'b''d''}{a^2}-12\frac{a'b'd'''}{a^2}+24\frac{a'^2b'd''}{a^3}-4\frac{a''''bd'}{a^2}-4\frac{a'''b'd'}{a^2}-4\frac{a'''bd''}{a^2}+8\frac{a'a'''bd'}{a^3}$$

$$-4\frac{a''bd'''}{a^2}-4\frac{a'b'd'''}{a^2}-4\frac{a'bd''''}{a^2}+8\frac{a'^2bd'''}{a^3}-4\frac{a''''b'd}{a^2}-4\frac{a'''b''d}{a^2}-4\frac{a'''b'd'}{a^2}+8\frac{a'a'''b'd}{a^3}$$

$$-4\frac{a''b'''d}{a^2}-4\frac{a'b''''d}{a^2}-4\frac{a'b'''d'}{a^2}+8\frac{a'^2b'''d}{a^3}-\frac{a'''''bd}{a^2}-\frac{a''''b'd}{a^2}-\frac{a''''bd'}{a^2}+2\frac{a'a''''bd}{a^3}$$

$$-6\frac{a'''b''d}{a^2}-6\frac{a''b'''d}{a^2}-6\frac{a''b''d'}{a^2}+12\frac{a'a''b''d}{a^3}-6\frac{a'''bd''}{a^2}-6\frac{a''b'd''}{a^2}-6\frac{a''bd'''}{a^2}+12\frac{a'a''bd''}{a^3}$$

$$+12\frac{a''a'''bd}{a^3}+6\frac{a''^2b'd}{a^3}+6\frac{a''^2bd'}{a^3}-18\frac{a'a''^2bd}{a^4}+24\frac{a'a''bd''}{a^3}+12\frac{a'^2b'd''}{a^3}+12\frac{a'^2bd'''}{a^3}$$

$$-36\frac{a'^3bd''}{a^4}+24\frac{a'a''b''d}{a^3}+12\frac{a'^2b'''d}{a^3}+12\frac{a'^2b''d'}{a^3}-36\frac{a'^3b''d}{a^4}$$

$$+48\frac{a'a''b'd'}{a^{3}}+24\frac{a'^{2}b''d'}{a^{3}}+24\frac{a'^{2}b'd''}{a^{3}}-24\cdot3\frac{a'^{3}b'd'}{a^{4}}-24\cdot3\frac{a'^{2}a''b'd}{a^{4}}-24\frac{a'^{3}b''d}{a^{4}}$$

$$-24\frac{a'^{3}b'd'}{a^{4}}+24\cdot4\frac{a'^{4}b'd}{a^{5}}-24\cdot3\frac{a'^{2}a''bd'}{a^{4}}-24\frac{a'^{3}b'd'}{a^{4}}-24\frac{a'^{3}bd''}{a^{4}}+24\cdot4\frac{a'^{4}bd'}{a^{5}}$$

$$+24\frac{a''^{2}b'd}{a^{3}}+24\frac{a'a'''b'd}{a^{3}}+24\frac{a'a''b''d}{a^{3}}+24\frac{a'a''b'd'}{a^{3}}-24\cdot3\frac{a'^{2}a''b'd}{a^{4}}$$

$$+24\frac{a''^{2}bd'}{a^{3}}+24\frac{a'a'''bd'}{a^{3}}+24\frac{a'a''b'd'}{a^{3}}+24\frac{a'a''bd''}{a^{3}}-24\cdot3\frac{a'^{2}a''bd'}{a^{4}}$$

$$+8\frac{a''a'''bd}{a^{3}}+8\frac{a'a''''bd}{a^{3}}+8\frac{a'a'''b'd}{a^{3}}+8\frac{a'a'''bd'}{a^{3}}-24\frac{a'^{2}a'''bd}{a^{4}}$$

$$-72\frac{a'a''^{2}bd}{a^{4}}-36\frac{a'^{2}a'''bd}{a^{4}}-36\frac{a'^{2}a''b'd}{a^{4}}-36\frac{a'^{2}a''bd'}{a^{4}}+36\cdot4\frac{a'^{3}a''bd}{a^{5}}$$

$$\left.+24\cdot4\frac{a'^{3}a''bd}{a^{5}}+24\frac{a'^{4}b'd}{a^{5}}+24\frac{a'^{4}bd'}{a^{5}}-24\cdot5\frac{a'^{5}bd}{a^{6}}\right)$$

$$=\left(\frac{a'''''c}{d}+\frac{a''''c'}{d}-\frac{a''''cd'}{d^{2}}+\frac{a'c''''}{d}+\frac{ac'''''}{d}-\frac{ac''''d'}{d^{2}}+4\frac{a''''c'}{d}+4\frac{a'''c''}{d}-4\frac{a'''c'd'}{d^{2}}\right.$$

$$+4\frac{a''c'''}{d}+4\frac{a'c''''}{d}-4\frac{a'c'''d'}{d^{2}}+6\frac{a'''c''}{d}+6\frac{a''c'''}{d}-6\frac{a''c''d'}{d^{2}}-6\frac{a'''cd''}{d^{2}}-6\frac{a''c'd''}{d^{2}}-6\frac{a''cd'''}{d^{2}}$$

$$+12\frac{a''cd'd''}{d^{3}}-6\frac{a'c''d''}{d^{2}}-6\frac{ac'''d''}{d^{2}}-6\frac{ac''d'''}{d^{2}}+12\frac{ac''d'd''}{d^{3}}-4\frac{a''cd'''}{d^{2}}-4\frac{a'c'd'''}{d^{2}}-4\frac{a'cd''''}{d^{2}}$$

$$+8\frac{a'cd'd'''}{d^{3}}-4\frac{a'c'd'''}{d^{2}}-4\frac{ac''d'''}{d^{2}}-4\frac{ac'd''''}{d^{2}}+8\frac{ac'd'd'''}{d^{3}}-4\frac{a''''cd'}{d^{2}}-4\frac{a'''c'd'}{d^{2}}-4\frac{a'''cd''}{d^{2}}$$

$$+8\frac{a'''cd'^{2}}{d^{3}}-4\frac{a'c'''d'}{d^{2}}-4\frac{ac''''d'}{d^{2}}-4\frac{ac'''d''}{d^{2}}+8\frac{ac'''d'^{2}}{d^{3}}-12\frac{a'''c'd'}{d^{2}}-12\frac{a''c''d'}{d^{2}}$$

$$-12\frac{a''c'd''}{d^{2}}+24\frac{a''c'd'^{2}}{d^{3}}-12\frac{a''c''d'}{d^{2}}-12\frac{a'c'''d'}{d^{2}}-12\frac{a'c''d''}{d^{2}}+24\frac{a'c''d'^{2}}{d^{3}}$$

$$-12\frac{a''c'd''}{d^{2}}-12\frac{a'c''d''}{d^{2}}-12\frac{a'c'd'''}{d^{2}}+24\frac{a'c'd'd''}{d^{3}}-\frac{a'cd''''}{d^{2}}-\frac{ac'd''''}{d^{2}}-\frac{acd'''''}{d^{2}}+2\frac{acd'd''''}{d^{3}}$$

$$+6\frac{a'cd''^{2}}{d^{3}}+6\frac{ac'd''^{2}}{d^{3}}+12\frac{acd''d'''}{d^{3}}-18\frac{acd'd''^{2}}{d^{4}}+8\frac{a'cd'd'''}{d^{3}}+8\frac{ac'd'd'''}{d^{3}}+8\frac{acd''d'''}{d^{3}}$$

$$+8\frac{acd'd''''}{d^{3}}-24\frac{acd'^{2}d'''}{d^{4}}+12\frac{a'c''d'^{2}}{d^{3}}+12\frac{ac'''d'^{2}}{d^{3}}+24\frac{ac''d'd''}{d^{3}}-36\frac{ac''d'^{3}}{d^{4}}$$

$$+12\frac{a'''cd'^{2}}{d^{3}}+12\frac{a''c'd'^{2}}{d^{3}}+24\frac{a''cd'd''}{d^{3}}-36\frac{a''cd'^{3}}{d^{4}}+24\frac{a''c'd'^{2}}{d^{3}}+24\frac{a'c''d'^{2}}{d^{3}}+48\frac{a'c'd'd''}{d^{3}}$$

$$-24\cdot3\frac{a'c'd'^{3}}{d^{4}}+24\frac{a''cd'd''}{d^{3}}+24\frac{a'c'd'd''}{d^{3}}+24\frac{a'cd''^{2}}{d^{3}}+24\frac{a'cd'd'''}{d^{3}}-24\cdot3\frac{a'cd'^{2}d''}{d^{4}}$$

$$+24\frac{a'c'd'd''}{d^3}+24\frac{ac''d'd''}{d^3}+24\frac{ac'd''^2}{d^3}+24\frac{ac'd'd'''}{d^3}-24\cdot 3\frac{ac'd'^2d''}{d^4}$$

$$-36\frac{a'cd'^2d''}{d^4}-36\frac{ac'd'^2d''}{d^4}-72\frac{acd'd''^2}{d^4}-36\frac{acd'^2d'''}{d^4}+36\cdot 4\frac{acd'^3d''}{d^5}$$

$$-24\frac{a'c'd'^3}{d^4}-24\frac{ac''d'^3}{d^4}-24\cdot 3\frac{ac'd'^2d''}{d^4}+24\cdot 4\frac{ac'd'^4}{d^5}-24\frac{a''cd'^3}{d^4}-24\frac{a'c'd'^3}{d^4}$$

$$\left.-24\cdot 3\frac{a'cd'^2d''}{d^4}+24\cdot 4\frac{a'cd'^4}{d^5}+24\frac{a'cd'^4}{d^5}+24\frac{ac'd'^4}{d^5}+24\cdot 4\frac{acd'^3d''}{d^5}-24\cdot 5\frac{acd'^5}{d^6}\right)$$

$$+\left(\frac{b'''''d}{c}+\frac{b''''d'}{c}-\frac{b''''c'd}{c^2}+\frac{b'd''''}{c}+\frac{bd'''''}{c}-\frac{bc'd''''}{c^2}+4\frac{b''''d'}{c}+4\frac{b'''d''}{c}-4\frac{b'''c'd'}{c^2}\right.$$

$$+4\frac{b''d'''}{c}+4\frac{b'd''''}{c}-4\frac{b'c'd'''}{c^2}+6\frac{b'''d''}{c}+6\frac{b''d'''}{c}-6\frac{b''c'd''}{c^2}-6\frac{b'''c''d}{c^2}-6\frac{b''c'''d}{c^2}$$

$$-6\frac{b''c''d'}{c^2}+12\frac{b''c'c''d}{c^3}-6\frac{b'c''d''}{c^2}-6\frac{bc'''d''}{c^2}-6\frac{bc''d'''}{c^2}+12\frac{bc'c''d''}{c^3}$$

$$-4\frac{b''''c'd}{c^2}-4\frac{b'''c''d}{c^2}-4\frac{b'''c'd'}{c^2}+8\frac{b'''c'^2d}{c^3}-4\frac{b''c'''d}{c^2}-4\frac{b'c''''d}{c^2}-4\frac{b'c'''d'}{c^2}+8\frac{b'c'c'''d}{c^3}$$

$$-4\frac{b'c'd'''}{c^2}-4\frac{bc''d'''}{c^2}-4\frac{bc'd''''}{c^2}+8\frac{bc'^2d'''}{c^3}-4\frac{b'c'''d'}{c^2}-4\frac{bc''''d'}{c^2}-4\frac{bc'''d''}{c^2}+8\frac{bc'c'''d'}{c^3}$$

$$-12\frac{b'''c'd'}{c^2}-12\frac{b''c''d'}{c^2}-12\frac{b''c'd''}{c^2}+24\frac{b''c'^2d'}{c^3}-12\frac{b''c''d'}{c^2}-12\frac{b'c'''d'}{c^2}-12\frac{b'c''d''}{c^2}$$

$$+24\frac{b'c'c''d'}{c^3}-12\frac{b''c'd''}{c^2}-12\frac{b'c''d''}{c^2}-12\frac{b'c'd'''}{c^2}+24\frac{b'c'^2d''}{c^3}$$

$$-\frac{b'c''''d}{c^2}-\frac{bc'''''d}{c^2}-\frac{bc''''d'}{c^2}+2\frac{bc'c''''d}{c^3}+6\frac{b'c''^2d}{c^3}+12\frac{bc''c'''d}{c^3}+6\frac{bc''^2d'}{c^3}-18\frac{bc'c''^2d}{c^4}$$

$$+8\frac{b'c'c'''d}{c^3}+8\frac{bc''c'''d}{c^3}+8\frac{bc'c''''d}{c^3}+8\frac{bc'c'''d'}{c^3}-24\frac{bc'^2c'''d}{c^4}+12\frac{b'''c'^2d}{c^3}$$

$$+24\frac{b''c'c''d}{c^3}+12\frac{b''c'^2d'}{c^3}-36\frac{b''c'^3d}{c^4}+12\frac{b'c'^2d''}{c^3}+24\frac{bc'c''d''}{c^3}+12\frac{bc'^2d'''}{c^3}-36\frac{bc'^3d''}{c^4}$$

$$+24\frac{b''c'^2d'}{c^3}+48\frac{b'c'c''d'}{c^3}+24\frac{b'c'^2d''}{c^3}-24\cdot 3\frac{b'c'^3d'}{c^4}+24\frac{b''c'c''d}{c^3}+24\frac{b'c''^2d}{c^3}$$

$$+24\frac{b'c'c'''d}{c^3}+24\frac{b'c'c''d'}{c^3}-24\cdot 3\frac{b'c'^2c''d}{c^4}+24\frac{b'c'c''d'}{c^3}+24\frac{bc''^2d'}{c^3}+24\frac{bc'c'''d'}{c^3}$$

$$+24\frac{bc'c''d''}{c^3}-24\cdot 3\frac{bc'^2c''d'}{c^4}-36\frac{b'c'^2c''d}{c^4}-72\frac{bc'c''^2d}{c^4}-36\frac{bc'^2c'''d}{c^4}-36\frac{bc'^2c''d'}{c^4}$$

$$+36\cdot 4\frac{bc'^3c''d}{c^5}-24\frac{b''c'^3d}{c^4}-24\cdot 3\frac{b'c'^2c''d}{c^4}-24\frac{b'c'^3d'}{c^4}+24\cdot 4\frac{b'c'^4d}{c^5}$$

$$-24\frac{b'c'^3d'}{c^4}-24\cdot 3\frac{bc'^2c''d'}{c^4}-24\frac{bc'^3d''}{c^4}+24\cdot 4\frac{bc'^4d'}{c^5}$$

$$\left.+24\frac{b'c'^4d}{c^5}+24\cdot 4\frac{bc'^3c''d}{c^5}+24\frac{bc'^4d'}{c^5}-24\cdot 5\frac{bc'^5d}{c^6}\right)$$

$$+5\left(+\frac{b''''d}{ac}+\frac{b'''d'}{ac}-\frac{a'b'''d}{a^2c}-\frac{b'''c'd}{ac^2}+\frac{b'd'''}{ac}+\frac{bd''''}{ac}-\frac{a'bd'''}{a^2c}-\frac{bc'd'''}{ac^2}\right.$$

$$+3\frac{b'''d'}{ac}+3\frac{b''d''}{ac}-3\frac{a'b''d'}{a^2c}-3\frac{b''c'd'}{ac^2}+3\frac{b''d''}{ac}+3\frac{b'd'''}{ac}-3\frac{a'b'd''}{a^2c}-3\frac{b'c'd''}{ac^2}$$

$$-3\frac{b'''c'd}{ac^2}-3\frac{b''c''d}{ac^2}-3\frac{b''c'd'}{ac^2}+3\frac{a'b''c'd}{a^2c^2}+6\frac{b''c'^2d}{ac^3}-6\frac{b''c'd'}{ac^2}-6\frac{b'c''d'}{ac^2}-6\frac{b'c'd''}{ac^2}$$

$$+6\frac{a'b'c'd'}{a^2c^2}+12\frac{b'c'^2d'}{ac^3}-3\frac{b'c'd''}{ac^2}-3\frac{bc''d''}{ac^2}-3\frac{bc'd'''}{ac^2}+3\frac{a'bc'd''}{a^2c^2}+6\frac{bc'^2d''}{ac^3}$$

$$-3\frac{b''c''d}{ac^2}-3\frac{b'c'''d}{ac^2}-3\frac{b'c''d'}{ac^2}+3\frac{a'b'c''d}{a^2c^2}+6\frac{b'c'c''d}{ac^3}-3\frac{b'c''d'}{ac^2}-3\frac{bc'''d'}{ac^2}-3\frac{bc''d''}{ac^2}$$

$$+3\frac{a'bc''d'}{a^2c^2}+6\frac{bc'c''d'}{ac^3}-\frac{b'c'''d}{ac^2}-\frac{bc''''d}{ac^2}-\frac{bc'''d'}{ac^2}+\frac{a'bc'''d}{a^2c^2}+2\frac{bc'c'''d}{ac^3}$$

$$+6\frac{b'c'c''d}{ac^3}+6\frac{bc''^2d}{ac^3}+6\frac{bc'c'''d}{ac^3}+6\frac{bc'c''d'}{ac^3}-6\frac{a'bc'c''d}{a^2c^3}-18\frac{bc'^2c''d}{ac^4}+6\frac{b''c'^2d}{ac^3}$$

$$+12\frac{b'c'c''d}{ac^3}+6\frac{b'c'^2d'}{ac^3}-6\frac{a'b'c'^2d}{a^2c^3}-18\frac{b'c'^3d}{ac^4}+6\frac{b'c'^2d'}{ac^3}+12\frac{bc'c''d'}{ac^3}+6\frac{bc'^2d''}{ac^3}$$

$$-6\frac{a'bc'^2d'}{a^2c^3}-18\frac{bc'^3d'}{ac^4}-6\frac{b'c'^3d}{ac^4}-18\frac{bc'^2c''d}{ac^4}-6\frac{bc'^3d'}{ac^4}+6\frac{a'bc'^3d}{a^2c^4}+24\frac{bc'^4d}{ac^5}-\frac{a''''bd}{a^2c}$$

$$-\frac{a'''b'd}{a^2c}-\frac{a'''bd'}{a^2c}+2\frac{a'a'''bd}{a^3c}+\frac{a'''bc'd}{a^2c^2}-3\frac{a'''bd'}{a^2c}-3\frac{a''b'd'}{a^2c}-3\frac{a''bd''}{a^2c}+6\frac{a'a''bd'}{a^3c}$$

$$+3\frac{a''bc'd'}{a^2c^2}-3\frac{a'''b'd}{a^2c}-3\frac{a''b''d}{a^2c}-3\frac{a''b'd'}{a^2c}+6\frac{a'a''b'd}{a^3c}+3\frac{a''b'c'd}{a^2c^2}-3\frac{a''b''d}{a^2c}-3\frac{a'b'''d}{a^2c}$$

$$-3\frac{a'b''d'}{a^2c}+6\frac{a'^2b''d}{a^3c}+3\frac{a'b''c'd}{a^2c^2}-3\frac{a''bd''}{a^2c}-3\frac{a'b'd''}{a^2c}-3\frac{a'bd'''}{a^2c}+6\frac{a'^2bd''}{a^3c}+3\frac{a'bc'd''}{a^2c^2}$$

$$-6\frac{a''b'd'}{a^2c}-6\frac{a'b''d'}{a^2c}-6\frac{a'b'd''}{a^2c}+12\frac{a'^2b'd'}{a^3c}+6\frac{a'b'c'd'}{a^2c^2}+3\frac{a''bc''d}{a^2c^2}+3\frac{a'b'c''d}{a^2c^2}$$

$$+3\frac{a'bc'''d}{a^2c^2}+3\frac{a'bc''d'}{a^2c^2}-6\frac{a'^2bc''d}{a^3c^2}-6\frac{a'bc'c''d}{a^2c^3}+3\frac{a'''bc'd}{a^2c^2}+3\frac{a''b'c'd}{a^2c^2}+3\frac{a''bc''d}{a^2c^2}$$

$$+3\frac{a''bc'd'}{a^2c^2}-6\frac{a'a''bc'd}{a^3c^2}-6\frac{a''bc'^2d}{a^2c^3}+6\frac{a''b'c'd}{a^2c^2}+6\frac{a'b''c'd}{a^2c^2}+6\frac{a'b'c''d}{a^2c^2}+6\frac{a'b'c'd'}{a^2c^2}$$

$$-12\frac{a'^2b'c'd}{a^3c^2}-12\frac{a'b'c'^2d}{a^2c^3}+6\frac{a''bc'd'}{a^2c^2}+6\frac{a'b'c'd'}{a^2c^2}+6\frac{a'bc''d'}{a^2c^2}+6\frac{a'bc'd''}{a^2c^2}-12\frac{a'^2bc'd'}{a^3c^2}$$

$$-12\frac{a'bc'^2d'}{a^2c^3}-6\frac{a''bc'^2d}{a^2c^3}-6\frac{a'b'c'^2d}{a^2c^3}-12\frac{a'bc'c''d}{a^2c^3}-6\frac{a'bc'^2d'}{a^2c^3}+12\frac{a'^2bc'^2d}{a^3c^3}$$

$$+18\frac{a'bc'^3d}{a^2c^4}+6\frac{a''^2bd}{a^3c}+6\frac{a'a'''bd}{a^3c}+6\frac{a'a''b'd}{a^3c}+6\frac{a'a''bd'}{a^3c}-18\frac{a'^2a''bd}{a^4c}-6\frac{a'a''bc'd}{a^3c^2}$$

$$+12\frac{a'a''b'd}{a^3c}+6\frac{a'^2b''d}{a^3c}+6\frac{a'^2b'd'}{a^3c}-18\frac{a'^3b'd}{a^4c}-6\frac{a'^2b'c'd}{a^3c^2}$$

$$+12\frac{a'a''bd'}{a^3c}+6\frac{a'^2b'd'}{a^3c}+6\frac{a'^2bd''}{a^3c}-18\frac{a'^3bd'}{a^4c}-6\frac{a'^2bc'd'}{a^3c^2}$$

$$-12\frac{a'a''bc'd}{a^3c^2}-6\frac{a'^2b'c'd}{a^3c^2}-6\frac{a'^2bc''d}{a^3c^2}-6\frac{a'^2bc'd'}{a^3c^2}+18\frac{a'^3bc'd}{a^4c^2}+12\frac{a'^2bc'^2d}{a^3c^3}$$

$$-18\frac{a'^2a''bd}{a^4c}-6\frac{a'^3b'd}{a^4c}-6\frac{a'^3bd'}{a^4c}+24\frac{a'^4bd}{a^5c}+6\frac{a'^3bc'd}{a^4c^2}$$

$$-\frac{a''''c}{bd}-\frac{a'''c'}{bd}+\frac{a'''b'c}{b^2d}+\frac{a'''cd'}{bd^2}-\frac{a'c'''}{bd}-\frac{ac''''}{bd}+\frac{ab'c'''}{b^2d}+\frac{ac'''d'}{bd^2}$$

$$-3\frac{a'''c'}{bd}-3\frac{a''c''}{bd}+3\frac{a''b'c'}{b^2d}+3\frac{a''c'd'}{bd^2}-3\frac{a''c''}{bd}-3\frac{a'c'''}{bd}+3\frac{a'b'c''}{b^2d}+3\frac{a'c''d'}{bd^2}$$

$$+3\frac{a'''cd'}{bd^2}+3\frac{a''c'd'}{bd^2}+3\frac{a''cd''}{bd^2}-3\frac{a''b'cd'}{b^2d^2}-6\frac{a''cd'^2}{bd^3}$$

$$+6\frac{a''c'd'}{bd^2}+6\frac{a'c''d'}{bd^2}+6\frac{a'c'd''}{bd^2}-6\frac{a'b'c'd'}{b^2d^2}-12\frac{a'c'd'^2}{bd^3}$$

$$+3\frac{a'c''d'}{bd^2}+3\frac{ac'''d'}{bd^2}+3\frac{ac''d''}{bd^2}-3\frac{ab'c''d'}{b^2d^2}-6\frac{ac''d'^2}{bd^3}$$

$$+3\frac{a''cd''}{bd^2}+3\frac{a'c'd''}{bd^2}+3\frac{a'cd'''}{bd^2}-3\frac{a'b'cd''}{b^2d^2}-6\frac{a'cd'd''}{bd^3}$$

$$+3\frac{a'c'd''}{bd^2}+3\frac{ac''d''}{bd^2}+3\frac{ac'd'''}{bd^2}-3\frac{ab'c'd''}{b^2d^2}-6\frac{ac'd'd''}{bd^3}$$

$$+\frac{a'cd'''}{bd^2}+\frac{ac'd'''}{bd^2}+\frac{acd''''}{bd^2}-\frac{ab'cd'''}{b^2d^2}-2\frac{acd'd'''}{bd^3}$$

$$-6\frac{a'cd'd''}{bd^3}-6\frac{ac'd'd''}{bd^3}-6\frac{acd''^2}{bd^3}-6\frac{acd'd'''}{bd^3}+6\frac{ab'cd'd''}{b^2d^3}+18\frac{acd'^2d''}{bd^4}$$

$$-6\frac{a''cd'^2}{bd^3}-6\frac{a'c'd'^2}{bd^3}-12\frac{a'cd'd''}{bd^3}+6\frac{a'b'cd'^2}{b^2d^3}+18\frac{a'cd'^3}{bd^4}$$

$$-6\frac{a'c'd'^2}{bd^3}-6\frac{ac''d'^2}{bd^3}-12\frac{ac'd'd''}{bd^3}+6\frac{ab'c'd'^2}{b^2d^3}+18\frac{ac'd'^3}{bd^4}$$

$$+6\frac{a'cd'^3}{bd^4}+6\frac{ac'd'^3}{bd^4}+18\frac{acd'^2d''}{bd^4}-6\frac{ab'cd'^3}{b^2d^4}-24\frac{acd'^4}{bd^5}$$

$$+\frac{a'b'''c}{b^2d}+\frac{ab''''c}{b^2d}+\frac{ab'''c'}{b^2d}-2\frac{ab'b'''c}{b^3d}-\frac{ab'''cd'}{b^2d^2}$$

$$+3\frac{a'b''c'}{b^2d}+3\frac{ab'''c'}{b^2d}+3\frac{ab''c''}{b^2d}-6\frac{ab'b''c'}{b^3d}-3\frac{ab''c'd'}{b^2d^2}$$

$$+3\frac{a'''b'c}{b^2d}+3\frac{a''b''c}{b^2d}+3\frac{a''b'c'}{b^2d}-6\frac{a''b'^2c}{b^3d}-3\frac{a''b'cd'}{b^2d^2}$$

$$+3\frac{a''b''c}{b^2d}+3\frac{a'b'''c}{b^2d}+3\frac{a'b''c'}{b^2d}-6\frac{a'b'b''c}{b^3d}-3\frac{a'b''cd'}{b^2d^2}$$

$$+3\frac{a'b'c''}{b^2d}+3\frac{ab''c''}{b^2d}+3\frac{ab'c'''}{b^2d}-6\frac{ab'^2c''}{b^3d}-3\frac{ab'c''d'}{b^2d^2}$$

$$+6\frac{a''b'c'}{b^2d}+6\frac{a'b''c'}{b^2d}+6\frac{a'b'c''}{b^2d}-12\frac{a'b'^2c'}{b^3d}-6\frac{a'b'c'd'}{b^2d^2}$$

$$-3\frac{a'b'cd''}{b^2d^2}-3\frac{ab''cd''}{b^2d^2}-3\frac{ab'c'd''}{b^2d^2}-3\frac{ab'cd'''}{b^2d^2}+6\frac{ab'^2cd''}{b^3d^2}+6\frac{ab'cd'd''}{b^2d^3}$$

$$-3\frac{a'b''cd'}{b^2d^2}-3\frac{ab'''cd'}{b^2d^2}-3\frac{ab''c'd'}{b^2d^2}-3\frac{ab''cd''}{b^2d^2}+6\frac{ab'b''cd'}{b^3d^2}+6\frac{ab''cd'^2}{b^2d^3}$$

$$-6\frac{a'b'c'd'}{b^2d^2}-6\frac{ab''c'd'}{b^2d^2}-6\frac{ab'c''d'}{b^2d^2}-6\frac{ab'c'd''}{b^2d^2}+12\frac{ab'^2c'd'}{b^3d^2}+12\frac{ab'c'd'^2}{b^2d^3}$$

$$-6\frac{a''b'cd'}{b^2d^2}-6\frac{a'b''cd'}{b^2d^2}-6\frac{a'b'c'd'}{b^2d^2}-6\frac{a'b'cd''}{b^2d^2}+12\frac{a'b'^2cd'}{b^3d^2}+12\frac{a'b'cd'^2}{b^2d^3}$$

$$+6\frac{a'b'cd'^2}{b^2d^3}+6\frac{ab''cd'^2}{b^2d^3}+6\frac{ab'c'd'^2}{b^2d^3}+12\frac{ab'cd'd''}{b^2d^3}-12\frac{ab'^2cd'^2}{b^3d^3}-18\frac{ab'cd'^3}{b^2d^4}$$

$$-6\frac{a'b'b''c}{b^3d}-6\frac{ab''^2c}{b^3d}-6\frac{ab'b'''c}{b^3d}-6\frac{ab'b''c'}{b^3d}+18\frac{ab'^2b''c}{b^4d}+6\frac{ab'b''cd'}{b^3d^2}$$

$$-6\frac{a''b'^2c}{b^3d}-12\frac{a'b'b''c}{b^3d}-6\frac{a'b'^2c'}{b^3d}+18\frac{a'b'^3c}{b^4d}+6\frac{a'b'^2cd'}{b^3d^2}$$

$$-6\frac{a'b'^2c'}{b^3d}-12\frac{ab'b''c'}{b^3d}-6\frac{ab'^2c''}{b^3d}+18\frac{ab'^3c'}{b^4d}+6\frac{ab'^2c'd'}{b^3d^2}$$

$$+6\frac{a'b'^2cd'}{b^3d^2}+12\frac{ab'b''cd'}{b^3d^2}+6\frac{ab'^2c'd'}{b^3d^2}+6\frac{ab'^2cd''}{b^3d^2}-18\frac{ab'^3cd'}{b^4d^2}-12\frac{ab'^2cd'^2}{b^3d^3}+v\frac{d^5}{dv^5}\left(\frac{bd}{ac}-\frac{ac}{bd}\right)$$

$$\left.+6\frac{a'b'^3c}{b^4d}+18\frac{ab'^2b''c}{b^4d}+6\frac{ab'^3c'}{b^4d}-24\frac{ab'^4c}{b^5d}-6\frac{ab'^3cd'}{b^4d^2}\right)$$

Merging the same kind term the 5⑤ becomes

$$\varphi_3'''''\cdot\left(\frac{ac}{b}+\frac{bd}{a}\right)+5\varphi_3''''\cdot\left(\frac{a'c}{b}+\frac{ac'}{b}-\frac{acb'}{b^2}+\frac{b'd}{a}+\frac{bd'}{a}-\frac{a'bd}{a^2}\right)$$

$$+10\varphi_3'''\cdot\left(\frac{a''c}{b}+2\frac{a'c'}{b}+\frac{ac''}{b}-\frac{ab''c}{b^2}-2\frac{ab'c'}{b^2}-2\frac{a'b'c}{b^2}+2\frac{ab'^2c}{b^3}\right.$$

$$\left.+\frac{b''d}{a}+2\frac{b'd'}{a}+\frac{bd''}{a}-\frac{a''bd}{a^2}-2\frac{a'b'd}{a^2}-2\frac{a'bd'}{a^2}+2\frac{a'^2bd}{a^3}\right)$$

$$+10\varphi_3''\left(\frac{a'''c}{b}+\frac{ac'''}{b}+3\frac{a''c'}{b}+3\frac{a'c''}{b}-\frac{ab'''c}{b^2}-3\frac{a''b'c}{b^2}-3\frac{a'b''c}{b^2}-3\frac{ab''c'}{b^2}-3\frac{ab'c''}{b^2}\right.$$

$$-6\frac{a'b'c'}{b^2}+6\frac{a'b'^2c}{b^3}+6\frac{ab'^2c'}{b^3}+6\frac{ab'b''c}{b^3}-6\frac{ab'^3c}{b^4}$$

$$+\frac{b'''d}{a}+\frac{bd'''}{a}+3\frac{b''d'}{a}+3\frac{b'd''}{a}-\frac{a'''bd}{a^2}-3\frac{a''b'd}{a^2}-3\frac{a'b''d}{a^2}-3\frac{a'bd''}{a^2}-3\frac{a''bd'}{a^2}$$

$$\left.-6\frac{a'b'd'}{a^2}+6\frac{a'^2bd'}{a^3}+6\frac{a'^2b'd}{a^3}+6\frac{a'a''bd}{a^3}-6\frac{a'^3bd}{a^4}\right)$$

$$+5\varphi_3'\left(\frac{a''''c}{b}+\frac{ac''''}{b}+4\frac{a'''c'}{b}+4\frac{a'c'''}{b}+6\frac{a''c''}{b}-12\frac{a''b'c'}{b^2}-12\frac{a'b''c'}{b^2}-12\frac{a'b'c''}{b^2}\right.$$

$$-4\frac{a'b'''c}{b^2}-4\frac{ab'''c'}{b^2}-4\frac{ab'c'''}{b^2}-4\frac{a'''b'c}{b^2}-\frac{ab''''c}{b^2}-6\frac{a''b''c}{b^2}-6\frac{ab''c''}{b^2}+6\frac{ab''^2c}{b^3}$$

$$+12\frac{a''b'^2c}{b^3}+12\frac{ab'^2c''}{b^3}+24\frac{a'b'^2c'}{b^3}-24\frac{a'b'^3c}{b^4}-24\frac{ab'^3c'}{b^4}+24\frac{ab'b''c'}{b^3}+24\frac{a'b'b''c}{b^3}$$

$$+8\frac{ab'b'''c}{b^3}-36\frac{ab'^2b''c}{b^4}+24\frac{ab'^4c}{b^5}$$

$$+\frac{b''''d}{a}+\frac{bd''''}{a}+4\frac{b'''d'}{a}+4\frac{b'd'''}{a}+6\frac{b''d''}{a}-12\frac{a''b'd'}{a^2}-12\frac{a'b''d'}{a^2}-12\frac{a'b'd''}{a^2}$$

$$-4\frac{a'''bd'}{a^2}-4\frac{a'bd'''}{a^2}-4\frac{a'''b'd}{a^2}-4\frac{a'b'''d}{a^2}-\frac{a''''bd}{a^2}-6\frac{a''b''d}{a^2}-6\frac{a''bd''}{a^2}+6\frac{{a''}^2bd}{a^3}$$

$$+12\frac{{a'}^2bd''}{a^3}+12\frac{{a'}^2b''d}{a^3}+24\frac{{a'}^2b'd'}{a^3}-24\frac{{a'}^3b'd}{a^4}-24\frac{{a'}^3bd'}{a^4}+24\frac{a'a''b'd}{a^3}+24\frac{a'a''bd'}{a^3}$$

$$\left.+8\frac{a'a'''bd}{a^3}-36\frac{{a'}^2a''bd}{a^4}+24\frac{{a'}^4bd}{a^5}\right)$$

$$+\varphi_3\left(+\frac{a'''''c}{b}+5\frac{a''''c'}{b}+5\frac{a'c''''}{b}+\frac{ac'''''}{b}+10\frac{a'''c''}{b}+10\frac{a''c'''}{b}-20\frac{a'''b'c'}{b^2}-20\frac{a'b'''c'}{b^2}\right.$$

$$-20\frac{a'b'c'''}{b^2}-5\frac{ab'c''''}{b^2}-5\frac{ab''''c'}{b^2}-5\frac{a'b''''c}{b^2}-5\frac{a''''b'c}{b^2}-30\frac{a'b''c''}{b^2}-30\frac{a''b'c''}{b^2}-30\frac{a''b''c'}{b^2}$$

$$-10\frac{ab'''c''}{b^2}-10\frac{ab''c'''}{b^2}-10\frac{a'''b''c}{b^2}-10\frac{a''b'''c}{b^2}-\frac{ab'''''c}{b^2}+10\frac{ab'b''''c}{b^3}+20\frac{a{b'}^2c'''}{b^3}+20\frac{a'''{b'}^2c}{b^3}$$

$$+30\frac{a'{b''}^2c}{b^3}+30\frac{a{b''}^2c'}{b^3}+60\frac{a'{b'}^2c''}{b^3}+60\frac{a''{b'}^2c'}{b^3}+120\frac{a'b'b''c'}{b^3}+40\frac{ab'b'''c'}{b^3}+40\frac{a'b'b'''c}{b^3}$$

$$+60\frac{a''b'b''c}{b^3}+60\frac{ab'b''c''}{b^3}+20\frac{ab''b'''c}{b^3}-90\frac{ab'{b''}^2c}{b^4}-60\frac{a{b'}^2b'''c}{b^4}$$

$$-60\frac{a{b'}^3c''}{b^4}-60\frac{a''{b'}^3c}{b^4}-120\frac{a'{b'}^3c'}{b^4}-180\frac{a{b'}^2b''c'}{b^4}-180\frac{a'{b'}^2b''c}{b^4}$$

$$+240\frac{a{b'}^3b''c}{b^5}+120\frac{a{b'}^4c'}{b^5}+120\frac{a'{b'}^4c}{b^5}-120\frac{a{b'}^5c}{b^6}$$

$$+\frac{b'''''d}{a}+5\frac{b''''d'}{a}+5\frac{b'd''''}{a}+\frac{bd'''''}{a}+10\frac{b''d'''}{a}+10\frac{b'''d''}{a}-20\frac{a'''b'd'}{a^2}-20\frac{a'b'''d'}{a^2}$$

$$-20\frac{a'b'd'''}{a^2}-5\frac{a'bd''''}{a^2}-5\frac{a'b''''d}{a^2}-5\frac{a''''bd'}{a^2}-5\frac{a''''b'd}{a^2}-30\frac{a'b''d''}{a^2}-30\frac{a''b''d'}{a^2}-30\frac{a''b'd''}{a^2}$$

$$-10\frac{a'''bd''}{a^2}-10\frac{a''bd'''}{a^2}-10\frac{a'''b''d}{a^2}-10\frac{a''b'''d}{a^2}-\frac{a'''''bd}{a^2}+10\frac{a'a''''bd}{a^3}+20\frac{a'^2bd'''}{a^3}+20\frac{a'^2b'''d}{a^3}$$

$$+30\frac{a''^2b'd}{a^3}+30\frac{a''^2bd'}{a^3}+60\frac{a'^2b''d'}{a^3}+60\frac{a'^2b'd''}{a^3}+120\frac{a'a''b'd'}{a^3}+40\frac{a'a'''bd'}{a^3}+40\frac{a'a'''b'd}{a^3}$$

$$+60\frac{a'a''b''d}{a^3}+60\frac{a'a''bd''}{a^3}+20\frac{a''a'''bd}{a^3}-90\frac{a'a''^2bd}{a^4}-60\frac{a'^2a'''bd}{a^4}$$

$$-60\frac{a'^3bd''}{a^4}-60\frac{a'^3b''d}{a^4}-120\frac{a'^3b'd'}{a^4}-180\frac{a'^2a''b'd}{a^4}-180\frac{a'^2a''bd'}{a^4}$$

$$+240\frac{a'^3a''bd}{a^5}+120\frac{a'^4b'd}{a^5}+120\frac{a'^4bd'}{a^5}-120\frac{a'^5bd}{a^6}\Bigg)$$

$$=\Bigg(\frac{a'''''c}{d}+5\frac{a''''c'}{d}+5\frac{a'c''''}{d}+\frac{ac'''''}{d}+10\frac{a'''c''}{d}+10\frac{a''c'''}{d}-20\frac{a'''c'd'}{d^2}-20\frac{a'c'''d'}{d^2}$$

$$-20\frac{a'c'd'''}{d^2}-5\frac{a''''cd'}{d^2}-5\frac{ac'd''''}{d^2}-5\frac{ac''''d'}{d^2}-5\frac{a'cd''''}{d^2}-30\frac{a'c''d''}{d^2}-30\frac{a''c'd''}{d^2}-30\frac{a''c''d'}{d^2}$$

$$-10\frac{a'''cd''}{d^2}-10\frac{a''cd'''}{d^2}-10\frac{ac'''d''}{d^2}-10\frac{ac''d'''}{d^2}-\frac{acd'''''}{d^2}+10\frac{acd'd''''}{d^3}+20\frac{a'''cd'^2}{d^3}+20\frac{ac'''d'^2}{d^3}$$

$$+30\frac{a'cd''^2}{d^3}+30\frac{ac'd''^2}{d^3}+60\frac{a''c'd'^2}{d^3}+60\frac{a'c''d'^2}{d^3}+120\frac{a'c'd'd''}{d^3}+40\frac{a'cd'd'''}{d^3}+40\frac{ac'd'd'''}{d^3}$$

$$+60\frac{a''cd'd''}{d^3}+60\frac{ac''d'd''}{d^3}+20\frac{acd''d'''}{d^3}-90\frac{acd'd''^2}{d^4}-60\frac{acd'^2d'''}{d^4}$$

$$-60\frac{ac''d'^3}{d^4}-60\frac{a''cd'^3}{d^4}-120\frac{a'c'd'^3}{d^4}-180\frac{a'cd'^2d''}{d^4}-180\frac{ac'd'^2d''}{d^4}$$

$$+240\frac{acd'^3d''}{d^5}+120\frac{ac'd'^4}{d^5}+120\frac{a'cd'^4}{d^5}-120\frac{acd'^5}{d^6}\Bigg)$$

$$+\left(\frac{b'''''d}{c}+5\frac{b''''d'}{c}+5\frac{b'd''''}{c}+\frac{bd'''''}{c}+10\frac{b'''d''}{c}+10\frac{b''d'''}{c}-20\frac{b'''c'd'}{c^{2}}-20\frac{b'c'''d'}{c^{2}}\right.$$

$$-20\frac{b'c'd'''}{c^{2}}-5\frac{b'c''''d}{c^{2}}-5\frac{b''''c'd}{c^{2}}-5\frac{bc'd''''}{c^{2}}-5\frac{bc''''d'}{c^{2}}-30\frac{b''c'd''}{c^{2}}-30\frac{b'c''d''}{c^{2}}-30\frac{b''c''d'}{c^{2}}$$

$$-10\frac{b'''c''d}{c^{2}}-10\frac{b''c'''d}{c^{2}}-10\frac{bc'''d''}{c^{2}}-10\frac{bc''d'''}{c^{2}}-\frac{bc'''''d}{c^{2}}+10\frac{bc'c''''d}{c^{3}}+20\frac{bc'^{2}d'''}{c^{3}}+20\frac{b'''c'^{2}d}{c^{3}}$$

$$+30\frac{b'c''^{2}d}{c^{3}}+30\frac{bc''^{2}d'}{c^{3}}+60\frac{b'c'^{2}d''}{c^{3}}+60\frac{b''c'^{2}d'}{c^{3}}+120\frac{b'c'c''d'}{c^{3}}+40\frac{b'c'c'''d}{c^{3}}+40\frac{bc'c'''d'}{c^{3}}$$

$$+60\frac{bc'c''d''}{c^{3}}+60\frac{b''c'c''d}{c^{3}}+20\frac{bc''c'''d}{c^{3}}-90\frac{bc'c''^{2}d}{c^{4}}-60\frac{bc'^{2}c'''d}{c^{4}}$$

$$-60\frac{b''c'^{3}d}{c^{4}}-60\frac{bc'^{3}d''}{c^{4}}-120\frac{b'c'^{3}d'}{c^{4}}-180\frac{b'c'^{2}c''d}{c^{4}}-180\frac{bc'^{2}c''d'}{c^{4}}$$

$$\left.+240\frac{bc'^{3}c''d}{c^{5}}+120\frac{b'c'^{4}d}{c^{5}}+120\frac{bc'^{4}d'}{c^{5}}-120\frac{bc'^{5}d}{c^{6}}\right)$$

$$+5\left(+\frac{b''''d}{ac}+\frac{bd''''}{ac}+4\frac{b'''d'}{ac}+4\frac{b'd'''}{ac}+6\frac{b''d''}{ac}-4\frac{a'''bd'}{a^{2}c}-4\frac{a'''b'd}{a^{2}c}-4\frac{a'b'''d}{a^{2}c}-4\frac{a'bd'''}{a^{2}c}\right.$$

$$-\frac{a''''bd}{a^{2}c}-4\frac{b'''c'd}{ac^{2}}-4\frac{bc'd'''}{ac^{2}}-4\frac{b'c'''d}{ac^{2}}-4\frac{bc'''d'}{ac^{2}}-\frac{bc''''d}{ac^{2}}-12\frac{a''b'd'}{a^{2}c}-12\frac{a'b''d'}{a^{2}c}$$

$$-12\frac{a'b'd''}{a^{2}c}-12\frac{b''c'd'}{ac^{2}}-12\frac{b'c''d'}{ac^{2}}-12\frac{b'c'd''}{ac^{2}}-6\frac{a''b''d}{a^{2}c}-6\frac{a''bd''}{a^{2}c}-6\frac{b''c''d}{ac^{2}}-6\frac{bc''d''}{ac^{2}}$$

$$+6\frac{a''^{2}bd}{a^{3}c}+6\frac{bc''^{2}d}{ac^{3}}+12\frac{a'^{2}b''d}{a^{3}c}+12\frac{a'^{2}bd''}{a^{3}c}+12\frac{b''c'^{2}d}{ac^{3}}+12\frac{bc'^{2}d''}{ac^{3}}$$

$$+24\frac{a'^{2}b'd'}{a^{3}c}+24\frac{b'c'^{2}d'}{ac^{3}}+24\frac{a'b'c'd'}{a^{2}c^{2}}+12\frac{a''b'c'd}{a^{2}c^{2}}+12\frac{a''bc'd'}{a^{2}c^{2}}+12\frac{a'bc'd''}{a^{2}c^{2}}+12\frac{a'bc''d'}{a^{2}c^{2}}$$

$$+12\frac{a'b''c'd}{a^{2}c^{2}}+12\frac{a'b'c''d}{a^{2}c^{2}}+6\frac{a''bc''d}{a^{2}c^{2}}+24\frac{a'a''b'd}{a^{3}c}+24\frac{a'a''bd'}{a^{3}c}+24\frac{b'c'c''d}{ac^{3}}+24\frac{bc'c''d'}{ac^{3}}$$

$$+8\frac{a'a'''bd}{a^{3}c}+8\frac{bc'c'''d}{ac^{3}}+4\frac{a'''bc'd}{a^{2}c^{2}}+4\frac{a'bc'''d}{a^{2}c^{2}}-24\frac{a'b'c'^{2}d}{a^{2}c^{3}}-24\frac{a'bc'^{2}d'}{a^{2}c^{3}}-24\frac{a'^{2}bc'd'}{a^{3}c^{2}}$$

$$-24\frac{a'^{2}b'c'd}{a^{3}c^{2}}-12\frac{a'^{2}bc''d}{a^{3}c^{2}}-12\frac{a''bc'^{2}d}{a^{2}c^{3}}-24\frac{a'^{3}b'd}{a^{4}c}-24\frac{a'^{3}bd'}{a^{4}c}-24\frac{b'c'^{3}d}{ac^{4}}-24\frac{bc'^{3}d'}{ac^{4}}$$

$$-36\frac{a'^{2}a''bd}{a^{4}c}-36\frac{bc'^{2}c''d}{ac^{4}}-24\frac{a'bc'c''d}{a^{2}c^{3}}-24\frac{a'a''bc'd}{a^{3}c^{2}}+24\frac{a'bc'^{3}d}{a^{2}c^{4}}+24\frac{a'^{3}bc'd}{a^{4}c^{2}}$$

$$+24\frac{a'^{2}bc'^{2}d}{a^{3}c^{3}}+24\frac{a'^{4}bd}{a^{5}c}+24\frac{bc'^{4}d}{ac^{5}}$$

$$-\frac{a''''c}{bd}-\frac{ac''''}{bd}-4\frac{a'''c'}{bd}-4\frac{a'c'''}{bd}-6\frac{a''c''}{bd}+4\frac{a'''b'c}{b^2d}+4\frac{a'''cd'}{bd^2}+4\frac{ab'c'''}{b^2d}+4\frac{ac'''d'}{bd^2}$$

$$+\frac{acd''''}{bd^2}+4\frac{a'cd'''}{bd^2}+4\frac{ac'd'''}{bd^2}+4\frac{a'b'''c}{b^2d}+4\frac{ab'''c'}{b^2d}+\frac{ab''''c}{b^2d}+12\frac{a''b'c'}{b^2d}+12\frac{a'b''c'}{b^2d}$$

$$+12\frac{a'b'c''}{b^2d}+12\frac{a''c'd'}{bd^2}+12\frac{a'c''d'}{bd^2}+12\frac{a'c'd''}{bd^2}+6\frac{a''b''c}{b^2d}+6\frac{ab''c''}{b^2d}+6\frac{a''cd''}{bd^2}+6\frac{ac''d''}{bd^2}$$

$$-6\frac{ab''^2c}{b^3d}-6\frac{acd''^2}{bd^3}-12\frac{a''cd'^2}{bd^3}-12\frac{ac''d'^2}{bd^3}-12\frac{ab'^2c''}{b^3d}-12\frac{a''b'^2c}{b^3d}$$

$$-24\frac{a'c'd'^2}{bd^3}-24\frac{a'b'^2c'}{b^3d}-24\frac{a'b'c'd'}{b^2d^2}-12\frac{ab'c''d'}{b^2d^2}-12\frac{ab'c'd''}{b^2d^2}-12\frac{a''b'cd'}{b^2d^2}-12\frac{a'b'cd''}{b^2d^2}$$

$$-12\frac{ab''c'd'}{b^2d^2}-12\frac{a'b''cd'}{b^2d^2}-6\frac{ab''cd''}{b^2d^2}-24\frac{ab'b''c'}{b^3d}-24\frac{a'b'b''c}{b^3d}-24\frac{ac'd'd''}{bd^3}-24\frac{a'cd'd''}{bd^3}$$

$$-8\frac{ab'b'''c}{b^3d}-8\frac{acd'd'''}{bd^3}-4\frac{ab'''cd'}{b^2d^2}-4\frac{ab'cd'''}{b^2d^2}+24\frac{a'b'cd'^2}{b^2d^3}+24\frac{ab'c'd'^2}{b^2d^3}+24\frac{ab'^2c'd'}{b^3d^2}$$

$$+24\frac{a'b'^2cd'}{b^3d^2}+12\frac{ab'^2cd''}{b^3d^2}+12\frac{ab''cd'^2}{b^2d^3}+24\frac{a'b'^3c}{b^4d}+24\frac{ab'^3c'}{b^4d}+24\frac{a'cd'^3}{bd^4}+24\frac{ac'd'^3}{bd^4}$$

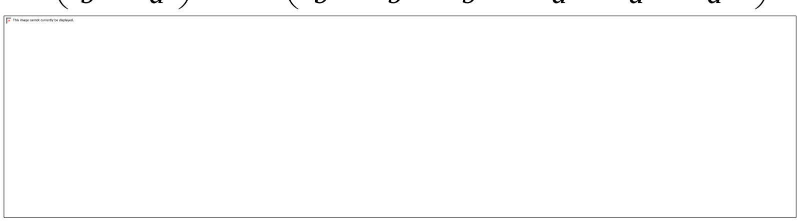
$$+36\frac{acd'^2d''}{bd^4}+36\frac{ab'^2b''c}{b^4d}+24\frac{ab'b''cd'}{b^3d^2}+24\frac{ab'cd'd''}{b^2d^3}-24\frac{ab'^3cd'}{b^4d^2}-24\frac{ab'cd'^3}{b^2d^4}$$

$$\left.-24\frac{ab'^2cd'^2}{b^3d^3}-24\frac{acd'^4}{bd^5}-24\frac{ab'^4c}{b^5d}\right)$$

$$+v\frac{d^5}{dv^5}\left(\frac{bd}{ac}-\frac{ac}{bd}\right)$$

The sixth derivation $\frac{d^6}{dv^6}\left[\left(\frac{ac}{b}+\frac{bd}{a}\right)(\varphi_3=)\right]$ is 5⑥:

$$\varphi_3^{''''''}\left(\frac{ac}{b}+\frac{bd}{a}\right)+6\varphi_3^{'''''}\left(\frac{a'c}{b}+\frac{ac'}{b}-\frac{acb'}{b^2}+\frac{b'd}{a}+\frac{bd'}{a}-\frac{a'bd}{a^2}\right)$$



$$+20\varphi_3^{'''}\cdot\left(\frac{a'''c}{b}+\frac{ac'''}{b}+3\frac{a''c'}{b}+3\frac{a'c''}{b}-\frac{ab'''c}{b^2}-3\frac{a''b'c}{b^2}-3\frac{a'b''c}{b^2}-3\frac{ab''c'}{b^2}-3\frac{ab'c''}{b^2}\right.$$

$$-6\frac{a'b'c'}{b^2}+6\frac{a'b'^2c}{b^3}+6\frac{ab'^2c'}{b^3}+6\frac{ab'b''c}{b^3}-6\frac{ab'^3c}{b^4}$$

$$+\frac{b'''d}{a}+\frac{bd'''}{a}+3\frac{b''d'}{a}+3\frac{b'd''}{a}-\frac{a'''bd}{a^2}-3\frac{a''b'd}{a^2}-3\frac{a'b''d}{a^2}-3\frac{a'bd''}{a^2}-3\frac{a''bd'}{a^2}$$

$$\left.-6\frac{a'b'd'}{a^2}+6\frac{a'^2bd'}{a^3}+6\frac{a'^2b'd}{a^3}+6\frac{a'a''bd}{a^3}-6\frac{a'^3bd}{a^4}\right)$$

$$+15\varphi_3''\left(\frac{a''''c}{b}+\frac{ac''''}{b}+4\frac{a'''c'}{b}+4\frac{a'c'''}{b}+6\frac{a''c''}{b}-12\frac{a''b'c'}{b^2}-12\frac{a'b''c'}{b^2}-12\frac{a'b'c''}{b^2}\right.$$

$$-4\frac{a'b'''c}{b^2}-4\frac{ab'''c'}{b^2}-4\frac{ab'c'''}{b^2}-4\frac{a'''b'c}{b^2}-\frac{ab''''c}{b^2}-6\frac{a''b''c}{b^2}-6\frac{ab''c''}{b^2}+6\frac{ab''^2c}{b^3}$$

$$+12\frac{a''b'^2c}{b^3}+12\frac{ab'^2c''}{b^3}+24\frac{a'b'^2c'}{b^3}-24\frac{a'b'^3c}{b^4}-24\frac{ab'^3c'}{b^4}+24\frac{ab'b''c'}{b^3}+24\frac{a'b'b''c}{b^3}$$

$$+8\frac{ab'b'''c}{b^3}-36\frac{ab'^2b''c}{b^4}+24\frac{ab'^4c}{b^5}$$

$$+\frac{b''''d}{a}+\frac{bd''''}{a}+4\frac{b'''d'}{a}+4\frac{b'd'''}{a}+6\frac{b''d''}{a}-12\frac{a''b'd'}{a^2}-12\frac{a'b''d'}{a^2}-12\frac{a'b'd''}{a^2}$$

$$-4\frac{a'''bd'}{a^2}-4\frac{a'bd'''}{a^2}-4\frac{a'''b'd}{a^2}-4\frac{a'b'''d}{a^2}-\frac{a''''bd}{a^2}-6\frac{a''b''d}{a^2}-6\frac{a''bd''}{a^2}+6\frac{a''^2bd}{a^3}$$

$$+12\frac{a'^2bd''}{a^3}+12\frac{a'^2b''d}{a^3}+24\frac{a'^2b'd'}{a^3}-24\frac{a'^3b'd}{a^4}-24\frac{a'^3bd'}{a^4}+24\frac{a'a''b'd}{a^3}+24\frac{a'a''bd'}{a^3}$$

$$\left.+8\frac{a'a'''bd}{a^3}-36\frac{a'^2a''bd}{a^4}+24\frac{a'^4bd}{a^5}\right)$$

$$+6\varphi_3'\left(+\frac{a'''''c}{b}+5\frac{a''''c'}{b}+5\frac{a'c''''}{b}+\frac{ac'''''}{b}+10\frac{a'''c''}{b}+10\frac{a''c'''}{b}-20\frac{a'''b'c'}{b^2}-20\frac{a'b'''c'}{b^2}\right.$$

$$-20\frac{a'b'c'''}{b^2}-5\frac{ab'c''''}{b^2}-5\frac{ab''''c'}{b^2}-5\frac{a'b''''c}{b^2}-5\frac{a''''b'c}{b^2}-30\frac{a'b''c''}{b^2}-30\frac{a''b'c''}{b^2}-30\frac{a''b''c'}{b^2}$$

$$-10\frac{ab'''c''}{b^2}-10\frac{ab''c'''}{b^2}-10\frac{a'''b''c}{b^2}-10\frac{a''b'''c}{b^2}-\frac{ab'''''c}{b^2}+10\frac{ab'b''''c}{b^3}+20\frac{ab'^2c'''}{b^3}+20\frac{a'''b'^2c}{b^3}$$

$$+30\frac{a'b''^2c}{b^3}+30\frac{ab''^2c'}{b^3}+60\frac{a'b'^2c''}{b^3}+60\frac{a''b'^2c'}{b^3}+120\frac{a'b'b''c'}{b^3}+40\frac{ab'b'''c'}{b^3}+40\frac{a'b'b'''c}{b^3}$$

$$+60\frac{a''b'b''c}{b^3}+60\frac{ab'b''c''}{b^3}+20\frac{ab''b'''c}{b^3}-90\frac{ab'b''^2c}{b^4}-60\frac{ab'^2b'''c}{b^4}$$

$$-60\frac{ab'^{3}c''}{b^{4}}-60\frac{a''b'^{3}c}{b^{4}}-120\frac{a'b'^{3}c'}{b^{4}}-180\frac{ab'^{2}b''c'}{b^{4}}-180\frac{a'b'^{2}b''c}{b^{4}}$$

$$+240\frac{ab'^{3}b''c}{b^{5}}+120\frac{ab'^{4}c'}{b^{5}}+120\frac{a'b'^{4}c}{b^{5}}-120\frac{ab'^{5}c}{b^{6}}$$

$$+\frac{b'''''d}{a}+5\frac{b''''d'}{a}+5\frac{b'd''''}{a}+\frac{bd'''''}{a}+10\frac{b''d'''}{a}+10\frac{b'''d''}{a}-20\frac{a'''b'd'}{a^{2}}-20\frac{a'b'''d'}{a^{2}}$$

$$-20\frac{a'b'd'''}{a^{2}}-5\frac{a'bd''''}{a^{2}}-5\frac{a'b''''d}{a^{2}}-5\frac{a''''bd'}{a^{2}}-5\frac{a''''b'd}{a^{2}}-30\frac{a'b''d''}{a^{2}}-30\frac{a''b''d'}{a^{2}}-30\frac{a''b'd''}{a^{2}}$$

$$-10\frac{a'''bd''}{a^{2}}-10\frac{a''bd'''}{a^{2}}-10\frac{a'''b''d}{a^{2}}-10\frac{a''b'''d}{a^{2}}-\frac{a'''''bd}{a^{2}}+10\frac{a'a''''bd}{a^{3}}+20\frac{a'^{2}bd'''}{a^{3}}+20\frac{a'^{2}b'''d}{a^{3}}$$

$$-10\frac{a'''bd''}{a^{2}}-10\frac{a''bd'''}{a^{2}}-10\frac{a'''b''d}{a^{2}}-10\frac{a''b'''d}{a^{2}}-\frac{a'''''bd}{a^{2}}+10\frac{a'a''''bd}{a^{3}}+20\frac{a'^{2}bd'''}{a^{3}}+20\frac{a'^{2}b'''d}{a^{3}}$$

$$+30\frac{a''^{2}b'd}{a^{3}}+30\frac{a''^{2}bd'}{a^{3}}+60\frac{a'^{2}b''d'}{a^{3}}+60\frac{a'^{2}b'd''}{a^{3}}+120\frac{a'a''b'd'}{a^{3}}+40\frac{a'a'''bd'}{a^{3}}+40\frac{a'a'''b'd}{a^{3}}$$

$$+60\frac{a'a''b''d}{a^{3}}+60\frac{a'a''bd''}{a^{3}}+20\frac{a''a'''bd}{a^{3}}-90\frac{a'a''^{2}bd}{a^{4}}-60\frac{a'^{2}a'''bd}{a^{4}}$$

$$-60\frac{a'^{3}bd''}{a^{4}}-60\frac{a'^{3}b''d}{a^{4}}-120\frac{a'^{3}b'd'}{a^{4}}-180\frac{a'^{2}a''b'd}{a^{4}}-180\frac{a'^{2}a''bd'}{a^{4}}$$

$$+240\frac{a'^{3}a''bd}{a^{5}}+120\frac{a'^{4}b'd}{a^{5}}+120\frac{a'^{4}bd'}{a^{5}}-120\frac{a'^{5}bd}{a^{6}}\Bigg)$$

$$+\varphi_{3}\Bigg(+\frac{a''''''c}{b}+\frac{a'''''c'}{b}-\frac{a'''''b'c}{b^{2}}+5\frac{a'''''c'}{b}+5\frac{a''''c''}{b}-5\frac{a''''b'c'}{b^{2}}+5\frac{a''c''''}{b}+5\frac{a'c'''''}{b}-5\frac{a'b'c''''}{b^{2}}$$

$$+\frac{a'c'''''}{b}+\frac{ac''''''}{b}-\frac{ab'c'''''}{b^{2}}+10\frac{a''''c''}{b}+10\frac{a'''c'''}{b}-10\frac{a'''b'c''}{b^{2}}+10\frac{a'''c'''}{b}+10\frac{a''c''''}{b}-10\frac{a''b'c'''}{b^{2}}$$

$$-20\frac{a''''b'c'}{b^{2}}-20\frac{a'''b''c'}{b^{2}}-20\frac{a'''b'c''}{b^{2}}+40\frac{a'''b'^{2}c'}{b^{3}}-20\frac{a''b'''c'}{b^{2}}-20\frac{a'b''''c'}{b^{2}}-20\frac{a'b'''c''}{b^{2}}$$

$$+40\frac{a'b'b'''c'}{b^{3}}$$

$$-20\frac{a''b'c'''}{b^2}-20\frac{a'b''c'''}{b^2}-20\frac{a'b'c''''}{b^2}+40\frac{a'{b'}^2c'''}{b^3}-5\frac{a'b'c''''}{b^2}-5\frac{ab''c''''}{b^2}$$

$$-5\frac{ab'c'''''}{b^2}+10\frac{a{b'}^2c''''}{b^3}-5\frac{a'b''''c'}{b^2}-5\frac{ab'''''c'}{b^2}-5\frac{ab''''c''}{b^2}+10\frac{ab'b''''c'}{b^3}-5\frac{a''b''''c}{b^2}-5\frac{a'b'''''c}{b^2}$$

$$-5\frac{a'b''''c'}{b^2}+10\frac{a'b'b''''c}{b^3}-5\frac{a'''''b'c}{b^2}-5\frac{a''''b''c}{b^2}-5\frac{a''''b'c'}{b^2}+10\frac{a''''{b'}^2c}{b^3}-30\frac{a''b''c''}{b^2}-30\frac{a'b'''c''}{b^2}$$

$$-30\frac{a'b''c'''}{b^2}+60\frac{a'b'b''c''}{b^3}-30\frac{a'''b'c''}{b^2}-30\frac{a''b''c''}{b^2}-30\frac{a''b'c'''}{b^2}+60\frac{a''{b'}^2c''}{b^3}-30\frac{a'''b''c'}{b^2}$$

$$-30\frac{a''b'''c'}{b^2}-30\frac{a''b''c''}{b^2}+60\frac{a''b'b''c'}{b^3}$$

$$-10\frac{a'b'''c''}{b^2}-10\frac{ab''''c''}{b^2}-10\frac{ab'''c'''}{b^2}+20\frac{ab'b'''c''}{b^3}-10\frac{a'b''c'''}{b^2}-10\frac{ab'''c'''}{b^2}-10\frac{ab''c''''}{b^2}$$

$$+20\frac{ab'b''c'''}{b^3}-10\frac{a''''b''c}{b^2}-10\frac{a'''b'''c}{b^2}-10\frac{a'''b''c'}{b^2}+20\frac{a'''b'b''c}{b^3}-10\frac{a'''b'''c}{b^2}-10\frac{a''b''''c}{b^2}$$

$$-10\frac{a''b'''c'}{b^2}+20\frac{a''b'b'''c}{b^3}-\frac{a'b'''''c}{b^2}-\frac{ab''''''c}{b^2}-\frac{ab'''''c'}{b^2}+2\frac{ab'b'''''c}{b^3}+10\frac{a'b'b''''c}{b^3}+10\frac{ab''b''''c}{b^3}$$

$$+10\frac{ab'b'''''c}{b^3}+10\frac{ab'b''''c'}{b^3}-30\frac{a{b'}^2b''''c}{b^4}+20\frac{a'{b'}^2c'''}{b^3}+40\frac{ab'b''c'''}{b^3}+20\frac{a{b'}^2c''''}{b^3}-60\frac{a{b'}^3c'''}{b^4}$$

$$+20\frac{a''''{b'}^2c}{b^3}+40\frac{a'''b'b''c}{b^3}+20\frac{a'''{b'}^2c'}{b^3}-60\frac{a'''{b'}^3c}{b^4}$$

$$+30\frac{a''{b''}^2c}{b^3}+60\frac{a'b''b'''c}{b^3}+30\frac{a'{b''}^2c'}{b^3}-90\frac{a'b'{b''}^2c}{b^4}+30\frac{a'{b''}^2c'}{b^3}+60\frac{ab''b'''c'}{b^3}+30\frac{a{b''}^2c''}{b^3}$$

$$-90\frac{ab'{b''}^2c'}{b^4}+60\frac{a''{b'}^2c''}{b^3}+120\frac{a'b'b''c''}{b^3}+60\frac{a'{b'}^2c'''}{b^3}-180\frac{a'{b'}^3c''}{b^4}+60\frac{a'''{b'}^2c'}{b^3}+120\frac{a''b'b''c'}{b^3}$$

$$+60\frac{a''{b'}^2c''}{b^3}-180\frac{a''{b'}^3c'}{b^4}+120\frac{a''b'b''c'}{b^3}+120\frac{a'{b''}^2c'}{b^3}+120\frac{a'b'b'''c'}{b^3}+120\frac{a'b'b''c''}{b^3}$$

$$-360\frac{a'{b'}^2b''c'}{b^4}+40\frac{a'b'b'''c'}{b^3}+40\frac{ab''b'''c'}{b^3}+40\frac{ab'b''''c'}{b^3}+40\frac{ab'b'''c''}{b^3}-120\frac{a{b'}^2b'''c'}{b^4}$$

$$+40\frac{a''b'b'''c}{b^3}+40\frac{a'b''b'''c}{b^3}+40\frac{a'b'b''''c}{b^3}+40\frac{a'b'b'''c'}{b^3}-120\frac{a'{b'}^2b'''c}{b^4}$$

$$+60\frac{a'''b'b''c}{b^3}+60\frac{a''b''^{2}c}{b^3}+60\frac{a''b'b'''c}{b^3}+60\frac{a''b'b''c'}{b^3}-180\frac{a''b'^{2}b''c}{b^4}+60\frac{a'b'b''c''}{b^3}+60\frac{ab''^{2}c''}{b^3}$$

$$+60\frac{ab'b'''c''}{b^3}+60\frac{ab'b''c'''}{b^3}-180\frac{ab'^{2}b''c''}{b^4}+20\frac{a'b''b'''c}{b^3}+20\frac{ab'''^{2}c}{b^3}+20\frac{ab''b''''c}{b^3}+20\frac{ab''b'''c'}{b^3}$$

$$-60\frac{ab'b''b'''c}{b^4}-90\frac{a'b'b''^{2}c}{b^4}-90\frac{ab''^{3}c}{b^4}-180\frac{ab'b''b'''c}{b^4}-90\frac{ab'b''^{2}c'}{b^4}+360\frac{ab'^{2}b''^{2}c}{b^5}$$

$$-60\frac{a'b'^{2}b'''c}{b^4}-120\frac{ab'b''b'''c}{b^4}-60\frac{ab'^{2}b''''c}{b^4}-60\frac{ab'^{2}b'''c'}{b^4}+240\frac{ab'^{3}b'''c}{b^5}$$

$$-60\frac{a'b'^{3}c''}{b^4}-180\frac{ab'^{2}b''c''}{b^4}-60\frac{ab'^{3}c'''}{b^4}+240\frac{ab'^{4}c''}{b^5}-60\frac{a'''b'^{3}c}{b^4}-180\frac{a''b'^{2}b''c}{b^4}$$

$$-60\frac{a''b'^{3}c'}{b^4}+240\frac{a''b'^{4}c}{b^5}-120\frac{a''b'^{3}c'}{b^4}-360\frac{a'b'^{2}b''c'}{b^4}-120\frac{a'b'^{3}c''}{b^4}+480\frac{a'b'^{4}c'}{b^5}$$

$$-180\frac{a'b'^{2}b''c'}{b^4}-360\frac{ab'b''^{2}c'}{b^4}-180\frac{ab'^{2}b'''c'}{b^4}-180\frac{ab'^{2}b''c''}{b^4}+720\frac{ab'^{3}b''c'}{b^5}$$

$$-180\frac{a''b'^{2}b''c}{b^4}-360\frac{a'b'b''^{2}c}{b^4}-180\frac{a'b'^{2}b'''c}{b^4}-180\frac{a'b'^{2}b''c'}{b^4}+720\frac{a'b'^{3}b''c}{b^5}$$

$$+240\frac{a'b'^{3}b''c}{b^5}+720\frac{ab'^{2}b''^{2}c}{b^5}+240\frac{ab'^{3}b'''c}{b^5}+240\frac{ab'^{3}b''c'}{b^5}-1200\frac{ab'^{4}b''c}{b^6}$$

$$+120\frac{a'b'^{4}c'}{b^5}+480\frac{ab'^{3}b''c'}{b^5}+120\frac{ab'^{4}c''}{b^5}-600\frac{ab'^{5}c'}{b^6}+120\frac{a''b'^{4}c}{b^5}+480\frac{a'b'^{3}b''c}{b^5}$$

$$+120\frac{a'b'^{4}c'}{b^5}-600\frac{a'b'^{5}c}{b^6}-120\frac{a'b'^{5}c}{b^6}-600\frac{ab'^{4}b''c}{b^6}-120\frac{ab'^{5}c'}{b^6}+720\frac{ab'^{6}c}{b^7}$$

$$+\frac{b''''''d}{a}+\frac{b'''''d'}{a}-\frac{a'b'''''d}{a^2}+5\frac{b'''''d'}{a}+5\frac{b''''d''}{a}-5\frac{a'b''''d'}{a^2}+5\frac{b''d''''}{a}+5\frac{b'd'''''}{a}-5\frac{a'b'd''''}{a^2}$$

$$+\frac{b'd'''''}{a}+\frac{bd''''''}{a}-\frac{a'bd'''''}{a^2}+10\frac{b'''d'''}{a}+10\frac{b''d''''}{a}-10\frac{a'b''d'''}{a^2}+10\frac{b''''d''}{a}+10\frac{b'''d'''}{a}$$

$$-10\frac{a'b'''d''}{a^2}-20\frac{a''''b'd'}{a^2}-20\frac{a'''b''d'}{a^2}-20\frac{a'''b'd''}{a^2}+40\frac{a'a'''b'd'}{a^3}-20\frac{a''b'''d'}{a^2}-20\frac{a'b''''d'}{a^2}$$

$$-20\frac{a'b'''d''}{a^2}+40\frac{a'^{2}b'''d'}{a^3}$$

$$-20\frac{a''b'd'''}{a^2}-20\frac{a'b''d'''}{a^2}-20\frac{a'b'd''''}{a^2}+40\frac{a'^{2}b'd'''}{a^3}-5\frac{a''bd''''}{a^2}-5\frac{a'b'd''''}{a^2}-5\frac{a'bd'''''}{a^2}$$

$$+10\frac{a'^{2}bd''''}{a^3}-5\frac{a''b''''d}{a^2}-5\frac{a'b'''''d}{a^2}-5\frac{a'b''''d'}{a^2}+10\frac{a'^{2}b''''d}{a^3}-5\frac{a'''''bd'}{a^2}-5\frac{a''''b'd'}{a^2}-5\frac{a''''bd''}{a^2}$$

$$+10\frac{a'a''''bd'}{a^3}-5\frac{a'''''b'd}{a^2}-5\frac{a''''b''d}{a^2}-5\frac{a''''b'd'}{a^2}+10\frac{a'a''''b'd}{a^3}-30\frac{a''b''d''}{a^2}-30\frac{a'b'''d''}{a^2}$$

$$-30\frac{a'b''d'''}{a^2}+60\frac{a'^{2}b''d''}{a^3}-30\frac{a'''b''d'}{a^2}-30\frac{a''b'''d'}{a^2}-30\frac{a''b''d''}{a^2}+60\frac{a'a''b''d'}{a^3}$$

$$-30\frac{a'''b'd''}{a^2}-30\frac{a''b''d''}{a^2}-30\frac{a''b'd'''}{a^2}+60\frac{a'a''b'd''}{a^3}$$

$$-10\frac{a''''bd''}{a^2}-10\frac{a'''b'd''}{a^2}-10\frac{a'''bd'''}{a^2}+20\frac{a'a'''bd''}{a^3}-10\frac{a'''bd'''}{a^2}-10\frac{a''b'd'''}{a^2}-10\frac{a''bd''''}{a^2}$$

$$+20\frac{a'a''bd'''}{a^3}-10\frac{a''''b''d}{a^2}-10\frac{a'''b'''d}{a^2}-10\frac{a'''b''d'}{a^2}+20\frac{a'a'''b''d}{a^3}-10\frac{a'''b'''d}{a^2}-10\frac{a''b''''d}{a^2}$$

$$-10\frac{a''b'''d'}{a^2}+20\frac{a'a''b'''d}{a^3}-\frac{a''''''bd}{a^2}-\frac{a'''''b'd}{a^2}-\frac{a'''''bd'}{a^2}+2\frac{a'a'''''bd}{a^3}+10\frac{a''a''''bd}{a^3}+10\frac{a'a'''''bd}{a^3}$$

$$+10\frac{a'a''''b'd}{a^3}+10\frac{a'a''''bd'}{a^3}-30\frac{a'^{2}a''''bd}{a^4}+40\frac{a'a''bd'''}{a^3}+20\frac{a'^{2}b'd'''}{a^3}+20\frac{a'^{2}bd''''}{a^3}-60\frac{a'^{3}bd'''}{a^4}$$

$$+40\frac{a'a''b'''d}{a^3}+20\frac{a'^{2}b''''d}{a^3}+20\frac{a'^{2}b'''d'}{a^3}-60\frac{a'^{3}b'''d}{a^4}$$

$$+60\frac{a''a'''b'd}{a^3}+30\frac{a''^{2}b''d}{a^3}+30\frac{a''^{2}b'd'}{a^3}-90\frac{a'a''^{2}b'd}{a^4}+60\frac{a''a'''bd'}{a^3}+30\frac{a''^{2}b'd'}{a^3}+30\frac{a''^{2}bd''}{a^3}$$

$$-90\frac{a'a''^{2}bd'}{a^4}+120\frac{a'a''b''d'}{a^3}+60\frac{a'^{2}b'''d'}{a^3}+60\frac{a'^{2}b''d''}{a^3}-180\frac{a'^{3}b''d'}{a^4}+120\frac{a'a''b'd''}{a^3}$$

$$+60\frac{a'^{2}b''d''}{a^3}+60\frac{a'^{2}b'd'''}{a^3}-180\frac{a'^{3}b'd''}{a^4}+120\frac{a''^{2}b'd'}{a^3}+120\frac{a'a'''b'd'}{a^3}+120\frac{a'a''b''d'}{a^3}$$

$$+120\frac{a'a''b'd''}{a^3}-360\frac{a'^{2}a''b'd'}{a^4}+40\frac{a''a'''bd'}{a^3}+40\frac{a'a''''bd'}{a^3}+40\frac{a'a'''b'd'}{a^3}+40\frac{a'a'''bd''}{a^3}$$

$$-120\frac{a'^{2}a'''bd'}{a^4}+40\frac{a''a'''b'd}{a^3}+40\frac{a'a''''b'd}{a^3}+40\frac{a'a'''b''d}{a^3}+40\frac{a'a'''b'd'}{a^3}-120\frac{a'^{2}a'''b'd}{a^4}$$

$$+60\frac{a''^2b''d}{a^3}+60\frac{a'a'''b''d}{a^3}+60\frac{a'a''b'''d}{a^3}+60\frac{a'a''b''d'}{a^3}-180\frac{a'^2a''b''d}{a^4}+60\frac{a''^2bd''}{a^3}$$

$$+60\frac{a'a'''bd''}{a^3}+60\frac{a'a''b'd''}{a^3}+60\frac{a'a''bd'''}{a^3}-180\frac{a'^2a''bd''}{a^4}+20\frac{a'''^2bd}{a^3}+20\frac{a''a''''bd}{a^3}$$

$$+20\frac{a''a'''b'd}{a^3}+20\frac{a''a'''bd'}{a^3}-60\frac{a'a''a'''bd}{a^4}-90\frac{a''^3bd}{a^4}-180\frac{a'a''a'''bd}{a^4}-90\frac{a'a''^2b'd}{a^4}$$

$$-90\frac{a'a''^2bd'}{a^4}+360\frac{a'^2a''^2bd}{a^5}-120\frac{a'a''a'''bd}{a^4}-60\frac{a'^2a''''bd}{a^4}-60\frac{a'^2a'''b'd}{a^4}-60\frac{a'^2a'''bd'}{a^4}$$

$$+240\frac{a'^3a'''bd}{a^5}$$

$$-180\frac{a'^2a''bd''}{a^4}-60\frac{a'^3b'd''}{a^4}-60\frac{a'^3bd'''}{a^4}+240\frac{a'^4bd''}{a^5}-180\frac{a'^2a''b''d}{a^4}-60\frac{a'^3b'''d}{a^4}$$

$$-60\frac{a'^3b''d'}{a^4}+240\frac{a'^4b''d}{a^5}-24\cdot 15\frac{a'^2a''b'd'}{a^4}-24\cdot 5\frac{a'^3b''d'}{a^4}-24\cdot 5\frac{a'^3b'd''}{a^4}$$

$$+24\cdot 20\frac{a'^4b'd'}{a^5}-30\cdot 12\frac{a'a''^2b'd}{a^4}-30\cdot 6\frac{a'^2a'''b'd}{a^4}-30\cdot 6\frac{a'^2a''b''d}{a^4}-30\cdot 6\frac{a'^2a''b'd'}{a^4}$$

$$+30\cdot 24\frac{a'^3a''b'd}{a^5}-30\cdot 12\frac{a'a''^2bd'}{a^4}-30\cdot 6\frac{a'^2a'''bd'}{a^4}-30\cdot 6\frac{a'^2a''b'd'}{a^4}-30\cdot 6\frac{a'^2a''bd''}{a^4}$$

$$+30\cdot 24\frac{a'^3a''bd'}{a^5}$$

$$+60\cdot 12\frac{a'^2a''^2bd}{a^5}+60\cdot 4\frac{a'^3a'''bd}{a^5}+60\cdot 4\frac{a'^3a''b'd}{a^5}+60\cdot 4\frac{a'^3a''bd'}{a^5}-60\cdot 20\frac{a'^4a''bd}{a^6}$$

$$+24\cdot 20\frac{a'^3a''b'd}{a^5}+24\cdot 5\frac{a'^4b''d}{a^5}+24\cdot 5\frac{a'^4b'd'}{a^5}-24\cdot 25\frac{a'^5b'd}{a^6}+24\cdot 20\frac{a'^3a''bd'}{a^5}$$

$$+24\cdot 5\frac{a'^4b'd'}{a^5}+24\cdot 5\frac{a'^4bd''}{a^5}-24\cdot 25\frac{a'^5bd'}{a^6}-24\cdot 25\frac{a'^4a''bd}{a^6}-24\cdot 5\frac{a'^5b'd}{a^6}$$

$$\left.-24\cdot 5\frac{a'^5bd'}{a^6}+24\cdot 30\frac{a'^6bd}{a^7}\right)$$

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$$\left(\frac{a''''''c}{d}+\frac{a'''''c'}{d}-\frac{a'''''cd'}{d^2}+5\frac{a'''''c'}{d}+5\frac{a''''c''}{d}-5\frac{a''''c'd'}{d^2}+5\frac{a''c''''}{d}+5\frac{a'c'''''}{d}-5\frac{a'c''''d'}{d^2}\right.$$

$$+\frac{a'c'''''}{d}+\frac{ac''''''}{d}-\frac{ac'''''d'}{d^2}+10\frac{a''''c''}{d}+10\frac{a'''c'''}{d}-10\frac{a'''c''d'}{d^2}+10\frac{a'''c'''}{d}+10\frac{a''c''''}{d}$$

$$-10\frac{a''c'''d'}{d^2}-20\frac{a''''c'd'}{d^2}-20\frac{a'''c''d'}{d^2}-20\frac{a'''c'd''}{d^2}+40\frac{a'''c'd'^2}{d^3}-20\frac{a''c'''d'}{d^2}-20\frac{a'c''''d'}{d^2}$$

$$-20\frac{a'c'''d''}{d^2}+40\frac{a'c'''d'^2}{d^3}$$

$$-20\frac{a''c'd'''}{d^2}-20\frac{a'c''d'''}{d^2}-20\frac{a'c'd''''}{d^2}+40\frac{a'c'd'd'''}{d^3}-5\frac{a'''''cd'}{d^2}-5\frac{a''''c'd'}{d^2}-5\frac{a''''cd''}{d^2}$$

$$+10\frac{a''''c{d'}^2}{d^3}-5\frac{a'c'd''''}{d^2}-5\frac{ac''d''''}{d^2}-5\frac{ac'd'''''}{d^2}+10\frac{ac'd'd''''}{d^3}-5\frac{a'c''''d'}{d^2}-5\frac{ac'''''d'}{d^2}-5\frac{ac''''d''}{d^2}$$

$$+10\frac{ac''''{d'}^2}{d^3}-5\frac{a''cd''''}{d^2}-5\frac{a'c'd''''}{d^2}-5\frac{a'cd'''''}{d^2}+10\frac{a'cd'd''''}{d^3}-30\frac{a''c''d''}{d^2}-30\frac{a'c'''d''}{d^2}$$

$$-30\frac{a'c''d'''}{d^2}+60\frac{a'c''d'd''}{d^3}-30\frac{a'''c'd''}{d^2}-30\frac{a''c''d''}{d^2}-30\frac{a''c'd'''}{d^2}+60\frac{a''c'd'd''}{d^3}-30\frac{a'''c''d'}{d^2}$$

$$-30\frac{a''c'''d'}{d^2}-30\frac{a''c''d''}{d^2}+60\frac{a''c''{d'}^2}{d^3}$$

$$-10\frac{a''''cd''}{d^2}-10\frac{a'''c'd''}{d^2}-10\frac{a'''cd'''}{d^2}+20\frac{a'''cd'd''}{d^3}-10\frac{a'''cd'''}{d^2}-10\frac{a''c'd'''}{d^2}-10\frac{a''cd''''}{d^2}$$

$$+20\frac{a''cd'd'''}{d^3}-10\frac{a'c'''d''}{d^2}-10\frac{ac''''d''}{d^2}-10\frac{ac'''d'''}{d^2}+20\frac{ac'''d'd''}{d^3}-10\frac{a'c''d'''}{d^2}-10\frac{ac'''d'''}{d^2}$$

$$-10\frac{ac''d''''}{d^2}+20\frac{ac''d'd'''}{d^3}-\frac{a'cd'''''}{d^2}-\frac{ac'd'''''}{d^2}-\frac{acd''''''}{d^2}+2\frac{acd'd'''''}{d^3}+10\frac{a'cd'd''''}{d^3}+10\frac{ac'd'd''''}{d^3}$$

$$+10\frac{acd''d''''}{d^3}+10\frac{acd'd'''''}{d^3}-30\frac{ac{d'}^2d''''}{d^4}+20\frac{a''''c{d'}^2}{d^3}+20\frac{a'''c'{d'}^2}{d^3}+40\frac{a'''cd'd''}{d^3}-60\frac{a'''c{d'}^3}{d^4}$$

$$+20\frac{a'c'''{d'}^2}{d^3}+20\frac{ac''''{d'}^2}{d^3}+40\frac{ac'''d'd''}{d^3}-60\frac{ac'''{d'}^3}{d^4}$$

$$+30\frac{a''cd''^2}{d^3}+30\frac{a'c'd''^2}{d^3}+60\frac{a'cd''d'''}{d^3}-90\frac{a'cd'd''^2}{d^4}+30\frac{a'c'd''^2}{d^3}+30\frac{ac''d''^2}{d^3}+60\frac{ac'd''d'''}{d^3}$$

$$-90\frac{ac'd'd''^2}{d^4}+60\frac{a'''c'd'^2}{d^3}+60\frac{a''c''d'^2}{d^3}+120\frac{a''c'd'd''}{d^3}-180\frac{a''c'd'^3}{d^4}+60\frac{a''c''d'^2}{d^3}+60\frac{a'c'''d'^2}{d^3}$$

$$+120\frac{a'c''d'd''}{d^3}-180\frac{a'c''d'^3}{d^4}+120\frac{a''c'd'd''}{d^3}+120\frac{a'c''d'd''}{d^3}+120\frac{a'c'd''d''}{d^3}+120\frac{a'c'd'd'''}{d^3}$$

$$-360\frac{a'c'd'^2d''}{d^4}+40\frac{a''cd'd'''}{d^3}+40\frac{a'c'd'd'''}{d^3}+40\frac{a'cd''d'''}{d^3}+40\frac{a'cd'd''''}{d^3}-120\frac{a'cd'^2d'''}{d^4}$$

$$+40\frac{a'c'd'd'''}{d^3}+40\frac{ac''d'd'''}{d^3}+40\frac{ac'd''d'''}{d^3}+40\frac{ac'd'd''''}{d^3}-120\frac{ac'd'^2d'''}{d^4}$$

$$+60\frac{a'''cd'd''}{d^3}+60\frac{a''c'd'd''}{d^3}+60\frac{a''cd''d''}{d^3}+60\frac{a''cd'd'''}{d^3}-180\frac{a''cd'^2d''}{d^4}+60\frac{a'c''d'd''}{d^3}$$

$$+60\frac{ac'''d'd''}{d^3}+60\frac{ac''d''^2}{d^3}+60\frac{ac''d'd'''}{d^3}-180\frac{ac''d'^2d''}{d^4}+20\frac{a'cd''d'''}{d^3}+20\frac{ac'd''d'''}{d^3}$$

$$+20\frac{acd'''^2}{d^3}+20\frac{acd''d''''}{d^3}-60\frac{acd'd''d'''}{d^4}-90\frac{a'cd'd''^2}{d^4}-90\frac{ac'd'd''^2}{d^4}-90\frac{acd''^3}{d^4}$$

$$-180\frac{acd'd''d'''}{d^4}+360\frac{acd'^2d''^2}{d^5}-60\frac{a'cd'^2d'''}{d^4}-60\frac{ac'd'^2d'''}{d^4}-120\frac{acd'd''d'''}{d^4}$$

$$-60\frac{acd'^2d''''}{d^4}+240\frac{acd'^3d'''}{d^5}$$

$$-60\frac{a'c''d'^3}{d^4}-60\frac{ac'''d'^3}{d^4}-180\frac{ac''d'^2d''}{d^4}+240\frac{ac''d'^4}{d^5}-60\frac{a'''cd'^3}{d^4}-60\frac{a''c'd'^3}{d^4}$$

$$-180\frac{a''cd'^2d''}{d^4}+240\frac{a''cd'^4}{d^5}-24\cdot 5\frac{a''c'd'^3}{d^4}-24\cdot 5\frac{a'c''d'^3}{d^4}-24\cdot 15\frac{a'c'd'^2d''}{d^4}$$

$$+24\cdot 20\frac{a'c'd'^4}{d^5}-30\cdot 6\frac{a''cd'^2d''}{d^4}-30\cdot 6\frac{a'c'd'^2d''}{d^4}-30\cdot 12\frac{a'cd'd''^2}{d^4}-30\cdot 6\frac{a'cd'^2d'''}{d^4}$$

$$+30\cdot 24\frac{a'cd'^3d''}{d^5}-30\cdot 6\frac{a'c'd'^2d''}{d^4}-30\cdot 6\frac{ac''d'^2d''}{d^4}-30\cdot 12\frac{ac'd'd''^2}{d^4}-30\cdot 6\frac{ac'd'^2d'''}{d^4}$$

$$+30\cdot 24\frac{ac'd'^3d''}{d^5}$$

$$+60\cdot 4\frac{a'cd'^{3}d''}{d^{5}}+60\cdot 4\frac{ac'd'^{3}d''}{d^{5}}+60\cdot 12\frac{acd'^{2}d''^{2}}{d^{5}}+60\cdot 4\frac{acd'^{3}d'''}{d^{5}}-60\cdot 20\frac{acd'^{4}d''}{d^{6}}$$

$$+24\cdot 5\frac{a'c'd'^{4}}{d^{5}}+24\cdot 5\frac{ac''d'^{4}}{d^{5}}+24\cdot 20\frac{ac'd'^{3}d''}{d^{5}}-24\cdot 25\frac{ac'd'^{5}}{d^{6}}+24\cdot 5\frac{a''cd'^{4}}{d^{5}}$$

$$+24\cdot 5\frac{a'c'd'^{4}}{d^{5}}+24\cdot 20\frac{a'cd'^{3}d''}{d^{5}}-24\cdot 25\frac{a'cd'^{5}}{d^{6}}-24\cdot 5\frac{a'cd'^{5}}{d^{6}}-24\cdot 5\frac{ac'd'^{5}}{d^{6}}$$

$$-24\cdot 25\frac{acd'^{4}d''}{d^{6}}+24\cdot 30\frac{acd'^{6}}{d^{7}}\Bigg)$$

$$+\Bigg(\frac{b''''''d}{c}+\frac{b'''''d'}{c}-\frac{b'''''c'd}{c^{2}}+5\frac{b'''''d'}{c}+5\frac{b''''d''}{c}-5\frac{b''''c'd'}{c^{2}}+5\frac{b''d''''}{c}+5\frac{b'd'''''}{c}-5\frac{b'c'd''''}{c^{2}}$$

$$+\frac{b'd'''''}{c}+\frac{bd''''''}{c}-\frac{bc'd'''''}{c^{2}}+10\frac{b''''d''}{c}+10\frac{b'''d'''}{c}-10\frac{b'''c'd''}{c^{2}}+10\frac{b'''d'''}{c}+10\frac{b''d''''}{c}$$

$$-10\frac{b''c'd'''}{c^{2}}-20\frac{b''''c'd'}{c^{2}}-20\frac{b'''c''d'}{c^{2}}-20\frac{b'''c'd''}{c^{2}}+40\frac{b'''c'^{2}d'}{c^{3}}-20\frac{b''c'''d'}{c^{2}}-20\frac{b'c''''d'}{c^{2}}$$

$$-20\frac{b'c'''d''}{c^{2}}+40\frac{b'c'c'''d'}{c^{3}}$$

$$-20\frac{b''c'd'''}{c^{2}}-20\frac{b'c''d'''}{c^{2}}-20\frac{b'c'd''''}{c^{2}}+40\frac{b'c'^{2}d'''}{c^{3}}-5\frac{b''c''''d}{c^{2}}-5\frac{b'c'''''d}{c^{2}}-5\frac{b'c''''d'}{c^{2}}$$

$$+10\frac{b'c'c''''d}{c^{3}}-5\frac{b'''''c'd}{c^{2}}-5\frac{b''''c''d}{c^{2}}-5\frac{b''''c'd'}{c^{2}}+10\frac{b''''c'^{2}d}{c^{3}}-5\frac{b'c'd''''}{c^{2}}-5\frac{bc''d''''}{c^{2}}$$

$$-5\frac{bc'd'''''}{c^{2}}+10\frac{bc'^{2}d''''}{c^{3}}-5\frac{b'c''''d'}{c^{2}}-5\frac{bc'''''d'}{c^{2}}-5\frac{bc''''d''}{c^{2}}+10\frac{bc'c''''d'}{c^{3}}-30\frac{b'''c'd''}{c^{2}}$$

$$-30\frac{b''c''d''}{c^{2}}-30\frac{b''c'd'''}{c^{2}}+60\frac{b''c'^{2}d''}{c^{3}}-30\frac{b''c''d''}{c^{2}}-30\frac{b'c'''d''}{c^{2}}-30\frac{b'c''d'''}{c^{2}}+60\frac{b'c'c''d''}{c^{3}}$$

$$-30\frac{b'''c''d'}{c^{2}}-30\frac{b''c'''d'}{c^{2}}-30\frac{b''c''d''}{c^{2}}+60\frac{b''c'c''d'}{c^{3}}$$

$$-10\frac{b''''c''d}{c^{2}}-10\frac{b'''c'''d}{c^{2}}-10\frac{b'''c''d'}{c^{2}}+20\frac{b'''c'c''d}{c^{3}}-10\frac{b'''c'''d}{c^{2}}-10\frac{b''c''''d}{c^{2}}-10\frac{b''c'''d'}{c^{2}}$$

$$+20\frac{b''c'c'''d}{c^{3}}-10\frac{b'c'''d''}{c^{2}}-10\frac{bc''''d''}{c^{2}}-10\frac{bc'''d'''}{c^{2}}+20\frac{bc'c'''d''}{c^{3}}-10\frac{b'c''d'''}{c^{2}}-10\frac{bc'''d'''}{c^{2}}$$

$$-10\frac{bc''d''''}{c^{2}}+20\frac{bc'c''d'''}{c^{3}}-\frac{b'c'''''d}{c^{2}}-\frac{bc''''''d}{c^{2}}-\frac{bc'''''d'}{c^{2}}+2\frac{bc'c'''''d}{c^{3}}+10\frac{b'c'c''''d}{c^{3}}+10\frac{bc''c''''d}{c^{3}}$$

$$+10\frac{bc'c'''''d}{c^{3}}+10\frac{bc'c''''d'}{c^{3}}-30\frac{bc'^{2}c''''d}{c^{4}}+20\frac{b'c'^{2}d'''}{c^{3}}+40\frac{bc'c''d'''}{c^{3}}+20\frac{bc'^{2}d''''}{c^{3}}-60\frac{bc'^{3}d'''}{c^{4}}$$

$$+20\frac{b''''c'^{2}d}{c^{3}}+40\frac{b'''c'c''d}{c^{3}}+20\frac{b'''c'^{2}d'}{c^{3}}-60\frac{b'''c'^{3}d}{c^{4}}$$

$$+30\frac{b''c''^2d}{c^3}+60\frac{b'c''c'''d}{c^3}+30\frac{b'c''^2d'}{c^3}-90\frac{b'c'c''^2d}{c^4}+30\frac{b'c''^2d'}{c^3}+60\frac{bc''c'''d'}{c^3}+30\frac{bc''^2d''}{c^3}$$

$$-90\frac{bc'c''^2d'}{c^4}+60\frac{b''c'^2d''}{c^3}+120\frac{b'c'c''d''}{c^3}+60\frac{b'c'^2d'''}{c^3}-180\frac{b'c'^3d''}{c^4}+60\frac{b'''c'^2d'}{c^3}+120\frac{b''c'c''d'}{c^3}$$

$$+60\frac{b''c'^2d''}{c^3}-180\frac{b''c'^3d'}{c^4}+120\frac{b''c'c''d'}{c^3}+120\frac{b'c''c''d'}{c^3}+120\frac{b'c'c'''d'}{c^3}+120\frac{b'c'c''d''}{c^3}$$

$$-360\frac{b'c'^2c''d'}{c^4}+40\frac{b''c'c'''d}{c^3}+40\frac{b'c''c'''d}{c^3}+40\frac{b'c'c''''d}{c^3}+40\frac{b'c'c'''d'}{c^3}-120\frac{b'c'^2c'''d}{c^4}$$

$$+40\frac{b'c'c'''d'}{c^3}+40\frac{bc''c'''d'}{c^3}+40\frac{bc'c''''d'}{c^3}+40\frac{bc'c'''d''}{c^3}-120\frac{bc'^2c'''d'}{c^4}$$

$$+60\frac{b'c'c''d''}{c^3}+60\frac{bc''^2d''}{c^3}+60\frac{bc'c'''d''}{c^3}+60\frac{bc'c''d'''}{c^3}-180\frac{bc'^2c''d''}{c^4}+60\frac{b'''c'c''d}{c^3}$$

$$+60\frac{b''c''^2d}{c^3}+60\frac{b''c'c'''d}{c^3}+60\frac{b''c'c''d'}{c^3}-180\frac{b''c'^2c''d}{c^4}+20\frac{b'c''c'''d}{c^3}+20\frac{bc'''^2d}{c^3}$$

$$+20\frac{bc''c''''d}{c^3}+20\frac{bc''c'''d'}{c^3}-60\frac{bc'c''c'''d}{c^4}-90\frac{b'c'c''^2d}{c^4}-90\frac{bc''^3d}{c^4}-180\frac{bc'c''c'''d}{c^4}$$

$$-90\frac{bc'c''^2d'}{c^4}+360\frac{bc'^2c''^2d}{c^5}-60\frac{b'c'^2c'''d}{c^4}-120\frac{bc'c''c'''d}{c^4}-60\frac{bc'^2c''''d}{c^4}-60\frac{bc'^2c'''d'}{c^4}$$

$$+240\frac{bc'^3c'''d}{c^5}$$

$$-60\frac{b'''c'^3d}{c^4}-180\frac{b''c'^2c''d}{c^4}-60\frac{b''c'^3d'}{c^4}+240\frac{b''c'^4d}{c^5}-60\frac{b'c'^3d''}{c^4}-180\frac{bc'^2c''d''}{c^4}$$

$$-60\frac{bc'^3d'''}{c^4}+240\frac{bc'^4d''}{c^5}-24\cdot 5\frac{b''c'^3d'}{c^4}-24\cdot 15\frac{b'c'^2c''d'}{c^4}-24\cdot 5\frac{b'c'^3d''}{c^4}$$

$$+24\cdot 20\frac{b'c'^4d'}{c^5}-30\cdot 6\frac{b''c'^2c''d}{c^4}-30\cdot 12\frac{b'c'c''^2d}{c^4}-30\cdot 6\frac{b'c'^2c'''d}{c^4}-30\cdot 6\frac{b'c'^2c''d'}{c^4}$$

$$+30\cdot 24\frac{b'c'^3c''d}{c^5}-30\cdot 6\frac{b'c'^2c''d'}{c^4}-30\cdot 12\frac{bc'c''^2d'}{c^4}-30\cdot 6\frac{bc'^2c'''d'}{c^4}-30\cdot 6\frac{bc'^2c''d''}{c^4}$$

$$+30\cdot 24\frac{bc'^3c''d'}{c^5}$$

$$+60\cdot 4\frac{b'c'^{3}c''d}{c^{5}}+60\cdot 12\frac{bc'^{2}c''^{2}d}{c^{5}}+60\cdot 4\frac{bc'^{3}c'''d}{c^{5}}+60\cdot 4\frac{bc'^{3}c''d'}{c^{5}}-60\cdot 20\frac{bc'^{4}c''d}{c^{6}}$$

$$+24\cdot 5\frac{b''c'^{4}d}{c^{5}}+24\cdot 20\frac{b'c'^{3}c''d}{c^{5}}+24\cdot 5\frac{b'c'^{4}d'}{c^{5}}-24\cdot 25\frac{b'c'^{5}d}{c^{6}}+24\cdot 5\frac{b'c'^{4}d'}{c^{5}}$$

$$+24\cdot 20\frac{bc'^{3}c''d'}{c^{5}}+24\cdot 5\frac{bc'^{4}d''}{c^{5}}-24\cdot 25\frac{bc'^{5}d'}{c^{6}}-24\cdot 5\frac{b'c'^{5}d}{c^{6}}-24\cdot 25\frac{bc'^{4}c''d}{c^{6}}$$

$$-24\cdot 5\frac{bc'^{5}d'}{c^{6}}+24\cdot 30\frac{bc'^{6}d}{c^{7}}\Bigg)$$

$$+6\Bigg(+\frac{b'''''d}{ac}+\frac{b''''d'}{ac}-\frac{a'b''''d}{a^{2}c}-\frac{b''''c'd}{ac^{2}}+\frac{b'd''''}{ac}+\frac{bd'''''}{ac}-\frac{a'bd''''}{a^{2}c}-\frac{bc'd''''}{ac^{2}}+4\frac{b''''d'}{ac}$$

$$+4\frac{b'''d''}{ac}-4\frac{a'b'''d'}{a^{2}c}-4\frac{b'''c'd'}{ac^{2}}+4\frac{b''d'''}{ac}+4\frac{b'd''''}{ac}-4\frac{a'b'd'''}{a^{2}c}-4\frac{b'c'd'''}{ac^{2}}+6\frac{b'''d''}{ac}+6\frac{b''d'''}{ac}$$

$$-6\frac{a'b''d''}{a^{2}c}-6\frac{b''c'd''}{ac^{2}}-4\frac{a''''bd'}{a^{2}c}-4\frac{a'''b'd'}{a^{2}c}-4\frac{a'''bd''}{a^{2}c}+8\frac{a'a'''bd'}{a^{3}c}+4\frac{a'''bc'd'}{a^{2}c^{2}}-4\frac{a''''b'd}{a^{2}c}$$

$$-4\frac{a'''b''d}{a^{2}c}-4\frac{a'''b'd'}{a^{2}c}+8\frac{a'a'''b'd}{a^{3}c}+4\frac{a'''b'c'd}{a^{2}c^{2}}-4\frac{a''b'''d}{a^{2}c}-4\frac{a'b''''d}{a^{2}c}-4\frac{a'b'''d'}{a^{2}c}+8\frac{a'^{2}b'''d}{a^{3}c}$$

$$+4\frac{a'b'''c'd}{a^{2}c^{2}}-4\frac{a''bd'''}{a^{2}c}-4\frac{a'b'd'''}{a^{2}c}-4\frac{a'bd''''}{a^{2}c}+8\frac{a'^{2}bd'''}{a^{3}c}+4\frac{a'bc'd'''}{a^{2}c^{2}}$$

$$-\frac{a'''''bd}{a^{2}c}-\frac{a''''b'd}{a^{2}c}-\frac{a''''bd'}{a^{2}c}+2\frac{a'a''''bd}{a^{3}c}+\frac{a''''bc'd}{a^{2}c^{2}}-4\frac{b''''c'd}{ac^{2}}-4\frac{b'''c''d}{ac^{2}}-4\frac{b'''c'd'}{ac^{2}}$$

$$+4\frac{a'b'''c'd}{a^{2}c^{2}}+8\frac{b'''c'^{2}d}{ac^{3}}-4\frac{b'c'd'''}{ac^{2}}-4\frac{bc''d'''}{ac^{2}}-4\frac{bc'd''''}{ac^{2}}+4\frac{a'bc'd'''}{a^{2}c^{2}}+8\frac{bc'^{2}d'''}{ac^{3}}-4\frac{b''c'''d}{ac^{2}}$$

$$-4\frac{b'c''''d}{ac^{2}}-4\frac{b'c'''d'}{ac^{2}}+4\frac{a'b'c'''d}{a^{2}c^{2}}+8\frac{b'c'c'''d}{ac^{3}}-4\frac{b'c'''d'}{ac^{2}}-4\frac{bc''''d'}{ac^{2}}-4\frac{bc'''d''}{ac^{2}}+4\frac{a'bc'''d'}{a^{2}c^{2}}$$

$$+8\frac{bc'c'''d'}{ac^{3}}-\frac{b'c''''d}{ac^{2}}-\frac{bc'''''d}{ac^{2}}-\frac{bc''''d'}{ac^{2}}+\frac{a'bc''''d}{a^{2}c^{2}}+2\frac{bc'c''''d}{ac^{3}}-12\frac{a'''b'd'}{a^{2}c}-12\frac{a''b''d'}{a^{2}c}$$

$$-12\frac{a''b'd''}{a^{2}c}+24\frac{a'a''b'd'}{a^{3}c}+12\frac{a''b'c'd'}{a^{2}c^{2}}-12\frac{a''b''d'}{a^{2}c}-12\frac{a'b'''d'}{a^{2}c}-12\frac{a'b''d''}{a^{2}c}+24\frac{a'^{2}b''d'}{a^{3}c}$$

$$+12\frac{a'b''c'd'}{a^{2}c^{2}}$$

$$-12\frac{a''b'd''}{a^2c}-12\frac{a'b''d''}{a^2c}-12\frac{a'b'd'''}{a^2c}+24\frac{a'^2b'd''}{a^3c}+12\frac{a'b'c'd''}{a^2c^2}-12\frac{b'''c'd'}{ac^2}-12\frac{b''c''d'}{ac^2}$$

$$-12\frac{b''c'd''}{ac^2}+12\frac{a'b''c'd'}{a^2c^2}+24\frac{b''c'^2d'}{ac^3}-12\frac{b''c''d'}{ac^2}-12\frac{b'c'''d'}{ac^2}-12\frac{b'c''d''}{ac^2}+12\frac{a'b'c''d'}{a^2c^2}$$

$$+24\frac{b'c'c''d'}{ac^3}-12\frac{b''c'd''}{ac^2}-12\frac{b'c''d''}{ac^2}-12\frac{b'c'd'''}{ac^2}+12\frac{a'b'c'd''}{a^2c^2}+24\frac{b'c'^2d''}{ac^3}-6\frac{a'''b''d}{a^2c}$$

$$-6\frac{a''b'''d}{a^2c}-6\frac{a''b''d'}{a^2c}+12\frac{a'a''b''d}{a^3c}+6\frac{a''b''c'd}{a^2c^2}-6\frac{a'''bd''}{a^2c}-6\frac{a''b'd''}{a^2c}-6\frac{a''bd'''}{a^2c}$$

$$+12\frac{a'a''bd''}{a^3c}+6\frac{a''bc'd''}{a^2c^2}-6\frac{b'''c''d}{ac^2}-6\frac{b''c'''d}{ac^2}-6\frac{b''c''d'}{ac^2}+6\frac{a'b''c''d}{a^2c^2}+12\frac{b''c'c''d}{ac^3}$$

$$-6\frac{b'c''d''}{ac^2}-6\frac{bc'''d''}{ac^2}-6\frac{bc''d'''}{ac^2}+6\frac{a'bc''d''}{a^2c^2}+12\frac{bc'c''d''}{ac^3}$$

$$+12\frac{a''a'''bd}{a^3c}+6\frac{a''^2b'd}{a^3c}+6\frac{a''^2bd'}{a^3c}-18\frac{a'a''^2bd}{a^4c}-6\frac{a''^2bc'd}{a^3c^2}+6\frac{b'c''^2d}{ac^3}+12\frac{bc''c'''d}{ac^3}$$

$$+6\frac{bc''^2d'}{ac^3}-6\frac{a'bc''^2d}{a^2c^3}-18\frac{bc'c''^2d}{ac^4}+24\frac{a'a''b''d}{a^3c}+12\frac{a'^2b'''d}{a^3c}+12\frac{a'^2b''d'}{a^3c}-36\frac{a'^3b''d}{a^4c}$$

$$-12\frac{a'^2b''c'd}{a^3c^2}+24\frac{a'a''bd''}{a^3c}+12\frac{a'^2b'd''}{a^3c}+12\frac{a'^2bd'''}{a^3c}-36\frac{a'^3bd''}{a^4c}-12\frac{a'^2bc'd''}{a^3c^2}+12\frac{b'''c'^2d}{ac^3}$$

$$+24\frac{b''c'c''d}{ac^3}+12\frac{b''c'^2d'}{ac^3}-12\frac{a'b''c'^2d}{a^2c^3}-36\frac{b''c'^3d}{ac^4}+12\frac{b'c'^2d''}{ac^3}+24\frac{bc'c''d''}{ac^3}+12\frac{bc'^2d'''}{ac^3}$$

$$-12\frac{a'bc'^2d''}{a^2c^3}-36\frac{bc'^3d''}{ac^4}$$

$$+48\frac{a'a''b'd'}{a^3c}+24\frac{a'^2b''d'}{a^3c}+24\frac{a'^2b'd''}{a^3c}-72\frac{a'^3b'd'}{a^4c}-24\frac{a'^2b'c'd'}{a^3c^2}+24\frac{b''c'^2d'}{ac^3}$$

$$+48\frac{b'c'c''d'}{ac^3}+24\frac{b'c'^2d''}{ac^3}-24\frac{a'b'c'^2d'}{a^2c^3}-72\frac{b'c'^3d'}{ac^4}+24\frac{a''b'c'd'}{a^2c^2}+24\frac{a'b''c'd'}{a^2c^2}$$

$$+24\frac{a'b'c''d'}{a^2c^2}+24\frac{a'b'c'd''}{a^2c^2}-48\frac{a'^2b'c'd'}{a^3c^2}-48\frac{a'b'c'^2d'}{a^2c^3}+12\frac{a'''b'c'd}{a^2c^2}+12\frac{a''b''c'd}{a^2c^2}$$

$$+12\frac{a''b'c''d}{a^2c^2}+12\frac{a''b'c'd'}{a^2c^2}-24\frac{a'a''b'c'd}{a^3c^2}-24\frac{a''b'c'^2d}{a^2c^3}+12\frac{a'''bc'd'}{a^2c^2}+12\frac{a''b'c'd'}{a^2c^2}$$

$$+12\frac{a''bc''d'}{a^2c^2}+12\frac{a''bc'd''}{a^2c^2}-24\frac{a'a''bc'd'}{a^3c^2}-24\frac{a''bc'^2d'}{a^2c^3}+12\frac{a''bc'd''}{a^2c^2}+12\frac{a'b'c'd''}{a^2c^2}$$

$$+12\frac{a'bc''d''}{a^2c^2}+12\frac{a'bc'd'''}{a^2c^2}-24\frac{a'^2bc'd''}{a^3c^2}-24\frac{a'bc'^2d''}{a^2c^3}+12\frac{a''bc''d'}{a^2c^2}+12\frac{a'b'c''d'}{a^2c^2}$$

$$+12\frac{a'bc'''d'}{a^2c^2}+12\frac{a'bc''d''}{a^2c^2}-24\frac{a'^2bc''d'}{a^3c^2}-24\frac{a'bc'c''d'}{a^2c^3}$$

$$+12\frac{a''b''c'd}{a^2c^2}+12\frac{a'b'''c'd}{a^2c^2}+12\frac{a'b''c''d}{a^2c^2}+12\frac{a'b''c'd'}{a^2c^2}-24\frac{a'^2b''c'd}{a^3c^2}-24\frac{a'b''c'^2d}{a^2c^3}$$

$$+12\frac{a''b'c''d}{a^2c^2}+12\frac{a'b''c''d}{a^2c^2}+12\frac{a'b'c'''d}{a^2c^2}+12\frac{a'b'c''d'}{a^2c^2}-24\frac{a'^2b'c''d}{a^3c^2}-24\frac{a'b'c'c''d}{a^2c^3}$$

$$+6\frac{a'''bc''d}{a^2c^2}+6\frac{a''b'c''d}{a^2c^2}+6\frac{a''bc'''d}{a^2c^2}+6\frac{a''bc''d'}{a^2c^2}-12\frac{a'a''bc''d}{a^3c^2}-12\frac{a''bc'c''d}{a^2c^3}$$

$$+24\frac{a''^2b'd}{a^3c}+24\frac{a'a'''b'd}{a^3c}+24\frac{a'a''b''d}{a^3c}+24\frac{a'a''b'd'}{a^3c}-72\frac{a'^2a''b'd}{a^4c}-24\frac{a'a''b'c'd}{a^3c^2}$$

$$+24\frac{a''^2bd'}{a^3c}+24\frac{a'a'''bd'}{a^3c}+24\frac{a'a''b'd'}{a^3c}+24\frac{a'a''bd''}{a^3c}-72\frac{a'^2a''bd'}{a^4c}-24\frac{a'a''bc'd'}{a^3c^2}$$

$$+24\frac{b''c'c''d}{ac^3}+24\frac{b'c''^2d}{ac^3}+24\frac{b'c'c'''d}{ac^3}+24\frac{b'c'c''d'}{ac^3}-24\frac{a'b'c'c''d}{a^2c^3}-72\frac{b'c'^2c''d}{ac^4}$$

$$+24\frac{b'c'c''d'}{ac^3}+24\frac{bc''^2d'}{ac^3}+24\frac{bc'c'''d'}{ac^3}+24\frac{bc'c''d''}{ac^3}-24\frac{a'bc'c''d'}{a^2c^3}-72\frac{bc'^2c''d'}{ac^4}$$

$$+8\frac{a''a'''bd}{a^3c}+8\frac{a'a''''bd}{a^3c}+8\frac{a'a'''b'd}{a^3c}+8\frac{a'a'''bd'}{a^3c}-24\frac{a'^2a'''bd}{a^4c}-8\frac{a'a'''bc'd}{a^3c^2}+8\frac{b'c'c'''d}{ac^3}$$

$$+8\frac{bc''c'''d}{ac^3}+8\frac{bc'c''''d}{ac^3}+8\frac{bc'c'''d'}{ac^3}-8\frac{a'bc'c'''d}{a^2c^3}-24\frac{bc'^2c'''d}{ac^4}+4\frac{a''''bc'd}{a^2c^2}+4\frac{a'''b'c'd}{a^2c^2}$$

$$+4\frac{a'''bc''d}{a^2c^2}+4\frac{a'''bc'd'}{a^2c^2}-8\frac{a'a'''bc'd}{a^3c^2}-8\frac{a'''bc'^2d}{a^2c^3}+4\frac{a''bc'''d}{a^2c^2}+4\frac{a'b'c'''d}{a^2c^2}+4\frac{a'bc''''d}{a^2c^2}$$

$$+4\frac{a'bc'''d'}{a^2c^2}-8\frac{a'^2bc'''d}{a^3c^2}-8\frac{a'bc'c'''d}{a^2c^3}-24\frac{a''b'c'^2d}{a^2c^3}-24\frac{a'b''c'^2d}{a^2c^3}-48\frac{a'b'c'c''d}{a^2c^3}$$

$$-24\frac{a'b'c'^2d'}{a^2c^3}+48\frac{a'^2b'c'^2d}{a^3c^3}+72\frac{a'b'c'^3d}{a^2c^4}-24\frac{a''bc'^2d'}{a^2c^3}-24\frac{a'b'c'^2d'}{a^2c^3}-48\frac{a'bc'c''d'}{a^2c^3}$$

$$-24\frac{a'bc'^2d''}{a^2c^3}+48\frac{a'^2bc'^2d'}{a^3c^3}+72\frac{a'bc'^3d'}{a^2c^4}-48\frac{a'a''bc'd'}{a^3c^2}-24\frac{a'^2b'c'd'}{a^3c^2}-24\frac{a'^2bc''d'}{a^3c^2}$$

$$-24\frac{a'^2bc'd''}{a^3c^2}+72\frac{a'^3bc'd'}{a^4c^2}+48\frac{a'^2bc'^2d'}{a^3c^3}$$

$$-48\frac{a'a''b'c'd}{a^3c^2}-24\frac{a'^2b''c'd}{a^3c^2}-24\frac{a'^2b'c''d}{a^3c^2}-24\frac{a'^2b'c'd'}{a^3c^2}+72\frac{a'^3b'c'd}{a^4c^2}+48\frac{a'^2b'c'^2d}{a^3c^3}$$

$$-24\frac{a'a''bc''d}{a^3c^2}-12\frac{a'^2b'c''d}{a^3c^2}-12\frac{a'^2bc'''d}{a^3c^2}-12\frac{a'^2bc''d'}{a^3c^2}+36\frac{a'^3bc''d}{a^4c^2}+24\frac{a'^2bc'c''d}{a^3c^3}$$

$$-12\frac{a'''bc'^2d}{a^2c^3}-12\frac{a''b'c'^2d}{a^2c^3}-24\frac{a''bc'c''d}{a^2c^3}-12\frac{a''bc'^2d'}{a^2c^3}+24\frac{a'a''bc'^2d}{a^3c^3}+36\frac{a''bc'^3d}{a^2c^4}$$

$$-72\frac{a'^2a''b'd}{a^4c}-24\frac{a'^3b''d}{a^4c}-24\frac{a'^3b'd'}{a^4c}+96\frac{a'^4b'd}{a^5c}+24\frac{a'^3b'c'd}{a^4c^2}-72\frac{a'^2a''bd'}{a^4c}$$

$$-24\frac{a'^3b'd'}{a^4c}-24\frac{a'^3bd''}{a^4c}+96\frac{a'^4bd'}{a^5c}+24\frac{a'^3bc'd'}{a^4c^2}-24\frac{b''c'^3d}{ac^4}-72\frac{b'c'^2c''d}{ac^4}-24\frac{b'c'^3d'}{ac^4}$$

$$+24\frac{a'b'c'^3d}{a^2c^4}+96\frac{b'c'^4d}{ac^5}-24\frac{b'c'^3d'}{ac^4}-72\frac{bc'^2c''d'}{ac^4}-24\frac{bc'^3d''}{ac^4}+24\frac{a'bc'^3d'}{a^2c^4}+96\frac{bc'^4d'}{ac^5}$$

$$-72\frac{a'a''^2bd}{a^4c}-36\frac{a'^2a'''bd}{a^4c}-36\frac{a'^2a''b'd}{a^4c}-36\frac{a'^2a''bd'}{a^4c}+36\cdot 4\frac{a'^3a''bd}{a^5c}+36\frac{a'^2a''bc'd}{a^4c^2}$$

$$-36\frac{b'c'^2c''d}{ac^4}-72\frac{bc'c''^2d}{ac^4}-36\frac{bc'^2c'''d}{ac^4}-36\frac{bc'^2c''d'}{ac^4}+36\frac{a'bc'^2c''d}{a^2c^4}+36\cdot 4\frac{bc'^3c''d}{ac^5}$$

$$-24\frac{a''bc'c''d}{a^2c^3}-24\frac{a'b'c'c''d}{a^2c^3}-24\frac{a'bc''^2d}{a^2c^3}-24\frac{a'bc'c'''d}{a^2c^3}-24\frac{a'bc'c''d'}{a^2c^3}+48\frac{a'^2bc'c''d}{a^3c^3}$$

$$+72\frac{a'bc'^2c''d}{a^2c^4}-24\frac{a''^2bc'd}{a^3c^2}-24\frac{a'a'''bc'd}{a^3c^2}-24\frac{a'a''b'c'd}{a^3c^2}-24\frac{a'a''bc''d}{a^3c^2}-24\frac{a'a''bc'd'}{a^3c^2}$$

$$+72\frac{a'^2a''bc'd}{a^4c^2}+48\frac{a'a''bc'^2d}{a^3c^3}+24\frac{a''bc'^3d}{a^2c^4}+24\frac{a'b'c'^3d}{a^2c^4}+72\frac{a'bc'^2c''d}{a^2c^4}+24\frac{a'bc'^3d'}{a^2c^4}$$

$$-48\frac{a'^2bc'^3d}{a^3c^4}-96\frac{a'bc'^4d}{a^2c^5}+72\frac{a'^2a''bc'd}{a^4c^2}+24\frac{a'^3b'c'd}{a^4c^2}+24\frac{a'^3bc''d}{a^4c^2}+24\frac{a'^3bc'd'}{a^4c^2}$$

$$-96\frac{a'^4bc'd}{a^5c^2}-48\frac{a'^3bc'^2d}{a^4c^3}$$

$$+48\frac{a'a''bc'^2d}{a^3c^3}+24\frac{a'^2b'c'^2d}{a^3c^3}+48\frac{a'^2bc'c''d}{a^3c^3}+24\frac{a'^2bc'^2d'}{a^3c^3}-72\frac{a'^3bc'^2d}{a^4c^3}-72\frac{a'^2bc'^3d}{a^3c^4}$$

$$+96\frac{a'^3a''bd}{a^5c}+24\frac{a'^4b'd}{a^5c}+24\frac{a'^4bd'}{a^5c}-120\frac{a'^5bd}{a^6c}-24\frac{a'^4bc'd}{a^5c^2}+24\frac{b'c'^4d}{ac^5}$$

$$+24\cdot 4\frac{bc'^3c''d}{ac^5}+24\frac{bc'^4d'}{ac^5}-24\frac{a'bc'^4d}{a^2c^5}-24\cdot 5\frac{bc'^5d}{ac^6}$$

$$-\frac{a'''''c}{bd}-\frac{a''''c'}{bd}+\frac{a''''b'c}{b^2d}+\frac{a''''cd'}{bd^2}-\frac{a'c''''}{bd}-\frac{ac'''''}{bd}+\frac{ab'c''''}{b^2d}+\frac{ac''''d'}{bd^2}-4\frac{a''''c'}{bd}-4\frac{a'''c''}{bd}$$

$$+4\frac{a'''b'c'}{b^2d}+4\frac{a'''c'd'}{bd^2}-4\frac{a''c'''}{bd}-4\frac{a'c''''}{bd}+4\frac{a'b'c'''}{b^2d}+4\frac{a'c'''d'}{bd^2}-6\frac{a'''c''}{bd}-6\frac{a''c'''}{bd}+6\frac{a''b'c''}{b^2d}$$

$$+6\frac{a''c''d'}{bd^2}+4\frac{a''''b'c}{b^2d}+4\frac{a'''b''c}{b^2d}+4\frac{a'''b'c'}{b^2d}-8\frac{a'''b'^2c}{b^3d}-4\frac{a'''b'cd'}{b^2d^2}+4\frac{a''''cd'}{bd^2}+4\frac{a'''c'd'}{bd^2}$$

$$+4\frac{a'''cd''}{bd^2}-4\frac{a'''b'cd'}{b^2d^2}-8\frac{a'''cd'^2}{bd^3}+4\frac{a'b'c'''}{b^2d}+4\frac{ab''c'''}{b^2d}+4\frac{ab'c''''}{b^2d}-8\frac{ab'^2c'''}{b^3d}-4\frac{ab'c'''d'}{b^2d^2}$$

$$+4\frac{a'c'''d'}{bd^2}+4\frac{ac''''d'}{bd^2}+4\frac{ac'''d''}{bd^2}-4\frac{ab'c'''d'}{b^2d^2}-8\frac{ac'''d'^2}{bd^3}$$

$$+\frac{a'cd''''}{bd^2}+\frac{ac'd''''}{bd^2}+\frac{acd'''''}{bd^2}-\frac{ab'cd''''}{b^2d^2}-2\frac{acd'd''''}{bd^3}+4\frac{a''cd'''}{bd^2}+4\frac{a'c'd'''}{bd^2}+4\frac{a'cd''''}{bd^2}$$

$$-4\frac{a'b'cd'''}{b^2d^2}-8\frac{a'cd'd'''}{bd^3}+4\frac{a'c'd'''}{bd^2}+4\frac{ac''d'''}{bd^2}+4\frac{ac'd''''}{bd^2}-4\frac{ab'c'd'''}{b^2d^2}-8\frac{ac'd'd'''}{bd^3}$$

$$+4\frac{a''b'''c}{b^2d}+4\frac{a'b''''c}{b^2d}+4\frac{a'b'''c'}{b^2d}-8\frac{a'b'b'''c}{b^3d}-4\frac{a'b'''cd'}{b^2d^2}+4\frac{a'b'''c'}{b^2d}+4\frac{ab''''c'}{b^2d}+4\frac{ab'''c''}{b^2d}$$

$$-8\frac{ab'b'''c'}{b^3d}-4\frac{ab'''c'd'}{b^2d^2}+\frac{a'b''''c}{b^2d}+\frac{ab'''''c}{b^2d}+\frac{ab''''c'}{b^2d}-2\frac{ab'b''''c}{b^3d}-\frac{ab''''cd'}{b^2d^2}+12\frac{a'''b'c'}{b^2d}$$

$$+12\frac{a''b''c'}{b^2d}+12\frac{a''b'c''}{b^2d}-24\frac{a''b'^2c'}{b^3d}-12\frac{a''b'c'd'}{b^2d^2}+12\frac{a''b''c'}{b^2d}+12\frac{a'b'''c'}{b^2d}+12\frac{a'b''c''}{b^2d}$$

$$-24\frac{a'b'b''c'}{b^3d}-12\frac{a'b''c'd'}{b^2d^2}$$

$$+12\frac{a''b'c''}{b^2d}+12\frac{a'b''c''}{b^2d}+12\frac{a'b'c'''}{b^2d}-24\frac{a'b'^2c''}{b^3d}-12\frac{a'b'c''d'}{b^2d^2}+12\frac{a'''c'd'}{bd^2}+12\frac{a''c''d'}{bd^2}$$

$$+12\frac{a''c'd''}{bd^2}-12\frac{a''b'c'd'}{b^2d^2}-24\frac{a''c'd'^2}{bd^3}+12\frac{a''c''d'}{bd^2}+12\frac{a'c'''d'}{bd^2}+12\frac{a'c''d''}{bd^2}-12\frac{a'b'c''d'}{b^2d^2}$$

$$-24\frac{a'c''d'^2}{bd^3}+12\frac{a''c'd''}{bd^2}+12\frac{a'c''d''}{bd^2}+12\frac{a'c'd'''}{bd^2}-12\frac{a'b'c'd''}{b^2d^2}-24\frac{a'c'd'd''}{bd^3}+6\frac{a'''b''c}{b^2d}$$

$$+6\frac{a''b'''c}{b^2d}+6\frac{a''b''c'}{b^2d}-12\frac{a''b'b''c}{b^3d}-6\frac{a''b''cd'}{b^2d^2}+6\frac{a'b''c''}{b^2d}+6\frac{ab'''c''}{b^2d}+6\frac{ab''c'''}{b^2d}-12\frac{ab'b''c''}{b^3d}$$

$$-6\frac{ab''c''d'}{b^2d^2}+6\frac{a'''cd''}{bd^2}+6\frac{a''c'd''}{bd^2}+6\frac{a''cd'''}{bd^2}-6\frac{a''b'cd''}{b^2d^2}-12\frac{a''cd'd''}{bd^3}$$

$$+6\frac{a'c''d''}{bd^2}+6\frac{ac'''d''}{bd^2}+6\frac{ac''d'''}{bd^2}-6\frac{ab'c''d''}{b^2d^2}-12\frac{ac''d'd''}{bd^3}$$

$$-6\frac{a'b''^2c}{b^3d}-12\frac{ab''b'''c}{b^3d}-6\frac{ab''^2c'}{b^3d}+18\frac{ab'b''^2c}{b^4d}+6\frac{ab''^2cd'}{b^3d^2}-6\frac{a'cd''^2}{bd^3}-6\frac{ac'd''^2}{bd^3}$$

$$-12\frac{acd''d'''}{bd^3}+6\frac{ab'cd''^2}{b^2d^3}+18\frac{acd'd''^2}{bd^4}-12\frac{a'''cd'^2}{bd^3}-12\frac{a''c'd'^2}{bd^3}-24\frac{a''cd'd''}{bd^3}+12\frac{a''b'cd'^2}{b^2d^3}$$

$$+36\frac{a''cd'^3}{bd^4}-12\frac{a'c''d'^2}{bd^3}-12\frac{ac'''d'^2}{bd^3}-24\frac{ac''d'd''}{bd^3}+12\frac{ab'c''d'^2}{b^2d^3}+36\frac{ac''d'^3}{bd^4}$$

$$-12\frac{a'b'^2c''}{b^3d}-24\frac{ab'b''c''}{b^3d}-12\frac{ab'^2c'''}{b^3d}+36\frac{ab'^3c''}{b^4d}+12\frac{ab'^2c''d'}{b^3d^2}$$

$$-12\frac{a'''b'^2c}{b^3d}-24\frac{a''b'b''c}{b^3d}-12\frac{a''b'^2c'}{b^3d}+36\frac{a''b'^3c}{b^4d}+12\frac{a''b'^2cd'}{b^3d^2}$$

$$-24\frac{a''c'd'^2}{bd^3}-24\frac{a'c''d'^2}{bd^3}-48\frac{a'c'd'd''}{bd^3}+24\frac{a'b'c'd'^2}{b^2d^3}+72\frac{a'c'd'^3}{bd^4}-24\frac{a''b'^2c'}{b^3d}$$

$$-48\frac{a'b'b''c'}{b^3d}-24\frac{a'b'^2c''}{b^3d}+72\frac{a'b'^3c'}{b^4d}+24\frac{a'b'^2c'd'}{b^3d^2}-24\frac{a''b'c'd'}{b^2d^2}-24\frac{a'b''c'd'}{b^2d^2}$$

$$-24\frac{a'b'c''d'}{b^2d^2}-24\frac{a'b'c'd''}{b^2d^2}+48\frac{a'b'^2c'd'}{b^3d^2}+48\frac{a'b'c'd'^2}{b^2d^3}-12\frac{a'b'c''d'}{b^2d^2}-12\frac{ab''c''d'}{b^2d^2}$$

$$-12\frac{ab'c'''d'}{b^2d^2}-12\frac{ab'c''d''}{b^2d^2}+24\frac{ab'^2c''d'}{b^3d^2}+24\frac{ab'c''d'^2}{b^2d^3}-12\frac{a'b'c'd''}{b^2d^2}-12\frac{ab''c'd''}{b^2d^2}$$

$$-12\frac{ab'c''d''}{b^2d^2}-12\frac{ab'c'd'''}{b^2d^2}+24\frac{ab'^2c'd''}{b^3d^2}+24\frac{ab'c'd'd''}{b^2d^3}-12\frac{a'''b'cd'}{b^2d^2}-12\frac{a''b''cd'}{b^2d^2}$$

$$-12\frac{a''b'c'd'}{b^2d^2}-12\frac{a''b'cd''}{b^2d^2}+24\frac{a''b'^2cd'}{b^3d^2}+24\frac{a''b'cd'^2}{b^2d^3}-12\frac{a''b'cd''}{b^2d^2}-12\frac{a'b''cd''}{b^2d^2}$$

$$-12\frac{a'b'c'd''}{b^2d^2}-12\frac{a'b'cd'''}{b^2d^2}+24\frac{a'b'^2cd''}{b^3d^2}+24\frac{a'b'cd'd''}{b^2d^3}$$

$$-12\frac{a'b''c'd'}{b^2d^2}-12\frac{ab'''c'd'}{b^2d^2}-12\frac{ab''c''d'}{b^2d^2}-12\frac{ab''c'd''}{b^2d^2}+24\frac{ab'b''c'd'}{b^3d^2}+24\frac{ab''c'd'^2}{b^2d^3}$$

$$-12\frac{a''b''cd'}{b^2d^2}-12\frac{a'b'''cd'}{b^2d^2}-12\frac{a'b''c'd'}{b^2d^2}-12\frac{a'b''cd''}{b^2d^2}+24\frac{a'b'b''cd'}{b^3d^2}+24\frac{a'b''cd'^2}{b^2d^3}$$

$$-6\frac{a'b''cd''}{b^2d^2}-6\frac{ab'''cd''}{b^2d^2}-6\frac{ab''c'd''}{b^2d^2}-6\frac{ab''cd'''}{b^2d^2}+12\frac{ab'b''cd''}{b^3d^2}+12\frac{ab''cd'd''}{b^2d^3}$$

$$-24\frac{a'b'b''c'}{b^3d}-24\frac{ab''^2c'}{b^3d}-24\frac{ab'b'''c'}{b^3d}-24\frac{ab'b''c''}{b^3d}+72\frac{ab'^2b''c'}{b^4d}+24\frac{ab'b''c'd'}{b^3d^2}$$

$$-24\frac{a''b'b''c}{b^3d}-24\frac{a'b''b''c}{b^3d}-24\frac{a'b'b'''c}{b^3d}-24\frac{a'b'b''c'}{b^3d}+72\frac{a'b'^2b''c}{b^4d}+24\frac{a'b'b''cd'}{b^3d^2}$$

$$-24\frac{a'c'd'd''}{bd^3}-24\frac{ac''d'd''}{bd^3}-24\frac{ac'd''^2}{bd^3}-24\frac{ac'd'd'''}{bd^3}+24\frac{ab'c'd'd''}{b^2d^3}+72\frac{ac'd'^2d''}{bd^4}$$

$$-24\frac{a''cd'd''}{bd^3}-24\frac{a'c'd'd''}{bd^3}-24\frac{a'cd''^2}{bd^3}-24\frac{a'cd'd'''}{bd^3}+24\frac{a'b'cd'd''}{b^2d^3}+72\frac{a'cd'^2d''}{bd^4}$$

$$-8\frac{a'b'b'''c}{b^3d}-8\frac{ab''b'''c}{b^3d}-8\frac{ab'b''''c}{b^3d}-8\frac{ab'b'''c'}{b^3d}+24\frac{ab'^2b'''c}{b^4d}+8\frac{ab'b'''cd'}{b^3d^2}-8\frac{a'cd'd'''}{bd^3}$$

$$-8\frac{ac'd'd'''}{bd^3}-8\frac{acd''d'''}{bd^3}-8\frac{acd'd''''}{bd^3}+8\frac{ab'cd'd'''}{b^2d^3}+24\frac{acd'^2d'''}{bd^4}-4\frac{a'b'''cd'}{b^2d^2}-4\frac{ab''''cd'}{b^2d^2}$$

$$-4\frac{ab'''c'd'}{b^2d^2}-4\frac{ab'''cd''}{b^2d^2}+8\frac{ab'b'''cd'}{b^3d^2}+8\frac{ab'''cd'^2}{b^2d^3}-4\frac{a'b'cd'''}{b^2d^2}-4\frac{ab''cd'''}{b^2d^2}-4\frac{ab'c'd'''}{b^2d^2}$$

$$-4\frac{ab'cd''''}{b^2d^2}+8\frac{ab'^2cd'''}{b^3d^2}+8\frac{ab'cd'd'''}{b^2d^3}+24\frac{a''b'cd'^2}{b^2d^3}+24\frac{a'b''cd'^2}{b^2d^3}+24\frac{a'b'c'd'^2}{b^2d^3}$$

$$+48\frac{a'b'cd'd''}{b^2d^3}-48\frac{a'b'^2cd'^2}{b^3d^3}-72\frac{a'b'cd'^3}{b^2d^4}+24\frac{a'b'c'd'^2}{b^2d^3}+24\frac{ab''c'd'^2}{b^2d^3}+24\frac{ab'c''d'^2}{b^2d^3}$$

$$+48\frac{ab'c'd'd''}{b^2d^3}-48\frac{ab'^2c'd'^2}{b^3d^3}-72\frac{ab'c'd'^3}{b^2d^4}+24\frac{a'b'^2c'd'}{b^3d^2}+48\frac{ab'b''c'd'}{b^3d^2}+24\frac{ab'^2c''d'}{b^3d^2}$$

$$+24\frac{ab'^2c'd''}{b^3d^2}-72\frac{ab'^3c'd'}{b^4d^2}-48\frac{ab'^2c'd'^2}{b^3d^3}$$

$$+24\frac{a''b'^2cd'}{b^3d^2}+48\frac{a'b'b''cd'}{b^3d^2}+24\frac{a'b'^2c'd'}{b^3d^2}+24\frac{a'b'^2cd''}{b^3d^2}-72\frac{a'b'^3cd'}{b^4d^2}-48\frac{a'b'^2cd'^2}{b^3d^3}$$

$$+12\frac{a'b'^2cd''}{b^3d^2}+24\frac{ab'b''cd''}{b^3d^2}+12\frac{ab'^2c'd''}{b^3d^2}+12\frac{ab'^2cd'''}{b^3d^2}-36\frac{ab'^3cd''}{b^4d^2}-24\frac{ab'^2cd'd''}{b^3d^3}$$

$$+12\frac{a'b''cd'^2}{b^2d^3}+12\frac{ab'''cd'^2}{b^2d^3}+12\frac{ab''c'd'^2}{b^2d^3}+24\frac{ab''cd'd''}{b^2d^3}-24\frac{ab'b''cd'^2}{b^3d^3}-36\frac{ab''cd'^3}{b^2d^4}$$

$$+24\frac{a''b'^3c}{b^4d}+72\frac{a'b'^2b''c}{b^4d}+24\frac{a'b'^3c'}{b^4d}-96\frac{a'b'^4c}{b^5d}-24\frac{a'b'^3cd'}{b^4d^2}+24\frac{a'b'^3c'}{b^4d}+72\frac{ab'^2b''c'}{b^4d}$$

$$+24\frac{ab'^3c''}{b^4d}-96\frac{ab'^4c'}{b^5d}-24\frac{ab'^3c'd'}{b^4d^2}+24\frac{a''cd'^3}{bd^4}+24\frac{a'c'd'^3}{bd^4}+72\frac{a'cd'^2d''}{bd^4}-24\frac{a'b'cd'^3}{b^2d^4}$$

$$-96\frac{a'cd'^4}{bd^5}+24\frac{a'c'd'^3}{bd^4}+24\frac{ac''d'^3}{bd^4}+72\frac{ac'd'^2d''}{bd^4}-24\frac{ab'c'd'^3}{b^2d^4}-96\frac{ac'd'^4}{bd^5}$$

$$+36\frac{a'cd'^2d''}{bd^4}+36\frac{ac'd'^2d''}{bd^4}+72\frac{acd'd''^2}{bd^4}+36\frac{acd'^2d'''}{bd^4}-36\frac{ab'cd'^2d''}{b^2d^4}-36\cdot 4\frac{acd'^3d''}{bd^5}$$

$$+36\frac{a'b'^2b''c}{b^4d}+72\frac{ab'b''^2c}{b^4d}+36\frac{ab'^2b'''c}{b^4d}+36\frac{ab'^2b''c'}{b^4d}-36\cdot 4\frac{ab'^3b''c}{b^5d}-36\frac{ab'^2b''cd'}{b^4d^2}$$

$$+24\frac{a'b'b''cd'}{b^3d^2}+24\frac{ab''^2cd'}{b^3d^2}+24\frac{ab'b'''cd'}{b^3d^2}+24\frac{ab'b''c'd'}{b^3d^2}+24\frac{ab'b''cd''}{b^3d^2}-72\frac{ab'^2b''cd'}{b^4d^2}$$

$$-48\frac{ab'b''cd'^2}{b^3d^3}+24\frac{a'b'cd'd''}{b^2d^3}+24\frac{ab''cd'd''}{b^2d^3}+24\frac{ab'c'd'd''}{b^2d^3}+24\frac{ab'cd''^2}{b^2d^3}+24\frac{ab'cd'd'''}{b^2d^3}$$

$$-48\frac{ab'^2cd'd''}{b^3d^3}-72\frac{ab'cd'^2d''}{b^2d^4}-24\frac{a'b'^3cd'}{b^4d^2}-72\frac{ab'^2b''cd'}{b^4d^2}-24\frac{ab'^3c'd'}{b^4d^2}-24\frac{ab'^3cd''}{b^4d^2}$$

$$+96\frac{ab'^4cd'}{b^5d^2}+48\frac{ab'^3cd'^2}{b^4d^3}-24\frac{a'b'cd'^3}{b^2d^4}-24\frac{ab''cd'^3}{b^2d^4}-24\frac{ab'c'd'^3}{b^2d^4}-72\frac{ab'cd'^2d''}{b^2d^4}$$

$$+48\frac{ab'^2cd'^3}{b^3d^4}+96\frac{ab'cd'^4}{b^2d^5}$$

$$-24\frac{a'b'^2cd'^2}{b^3d^3}-48\frac{ab'b''cd'^2}{b^3d^3}-24\frac{ab'^2c'd'^2}{b^3d^3}-48\frac{ab'^2cd'd''}{b^3d^3}+72\frac{ab'^3cd'^2}{b^4d^3}+72\frac{ab'^2cd'^3}{b^3d^4}$$

$$-24\frac{a'cd'^4}{bd^5}-24\frac{ac'd'^4}{bd^5}-96\frac{acd'^3d''}{bd^5}+24\frac{ab'cd'^4}{b^2d^5}+120\frac{acd'^5}{bd^6}$$

$$\left.-24\frac{a'b'^4c}{b^5d}-96\frac{ab'^3b''c}{b^5d}-24\frac{ab'^4c'}{b^5d}+120\frac{ab'^5c}{b^6d}+24\frac{ab'^4cd'}{b^5d^2}\right)$$

$$+v\frac{d^6}{dv^6}\left(\frac{bd}{ac}-\frac{ac}{bd}\right)$$

Merging the same kind term the 5⑥ becomes

$$\varphi_3^{''''''}\left(\frac{ac}{b}+\frac{bd}{a}\right)+6\varphi_3^{'''''}\left(\frac{a'c}{b}+\frac{ac'}{b}-\frac{acb'}{b^2}+\frac{b'd}{a}+\frac{bd'}{a}-\frac{a'bd}{a^2}\right)$$

$$+20\varphi_3'''\cdot\Bigg(\frac{a'''c}{b}+\frac{ac'''}{b}+3\frac{a''c'}{b}+3\frac{a'c''}{b}-\frac{ab'''c}{b^2}-3\frac{a''b'c}{b^2}-3\frac{a'b''c}{b^2}-3\frac{ab''c'}{b^2}-3\frac{ab'c''}{b^2}$$

$$-6\frac{a'b'c'}{b^2}+6\frac{a'b'^2c}{b^3}+6\frac{ab'^2c'}{b^3}+6\frac{ab'b''c}{b^3}-6\frac{ab'^3c}{b^4}$$

$$+\frac{b'''d}{a}+\frac{bd'''}{a}+3\frac{b''d'}{a}+3\frac{b'd''}{a}-\frac{a'''bd}{a^2}-3\frac{a''b'd}{a^2}-3\frac{a'b''d}{a^2}-3\frac{a'bd''}{a^2}-3\frac{a''bd'}{a^2}$$

$$-6\frac{a'b'd'}{a^2}+6\frac{a'^2bd'}{a^3}+6\frac{a'^2b'd}{a^3}+6\frac{a'a''bd}{a^3}-6\frac{a'^3bd}{a^4}\Bigg)$$

$$+15\varphi_3''\Bigg(\frac{a''''c}{b}+\frac{ac''''}{b}+4\frac{a'''c'}{b}+4\frac{a'c'''}{b}+6\frac{a''c''}{b}-12\frac{a''b'c'}{b^2}-12\frac{a'b''c'}{b^2}-12\frac{a'b'c''}{b^2}$$

$$-4\frac{a'b'''c}{b^2}-4\frac{ab'''c'}{b^2}-4\frac{ab'c'''}{b^2}-4\frac{a'''b'c}{b^2}-\frac{ab''''c}{b^2}-6\frac{a''b''c}{b^2}-6\frac{ab''c''}{b^2}+6\frac{ab''^2c}{b^3}$$

$$+12\frac{a''b'^2c}{b^3}+12\frac{ab'^2c''}{b^3}+24\frac{a'b'^2c'}{b^3}-24\frac{a'b'^3c}{b^4}-24\frac{ab'^3c'}{b^4}+24\frac{ab'b''c'}{b^3}+24\frac{a'b'b''c}{b^3}$$

$$+8\frac{ab'b'''c}{b^3}-36\frac{ab'^2b''c}{b^4}+24\frac{ab'^4c}{b^5}$$

$$+\frac{b''''d}{a}+\frac{bd''''}{a}+4\frac{b'''d'}{a}+4\frac{b'd'''}{a}+6\frac{b''d''}{a}-12\frac{a''b'd'}{a^2}-12\frac{a'b''d'}{a^2}-12\frac{a'b'd''}{a^2}$$

$$-4\frac{a'''bd'}{a^2}-4\frac{a'bd'''}{a^2}-4\frac{a'''b'd}{a^2}-4\frac{a'b'''d}{a^2}-\frac{a''''bd}{a^2}-6\frac{a''b''d}{a^2}-6\frac{a''bd''}{a^2}+6\frac{a''^2bd}{a^3}$$

$$+12\frac{a'^2bd''}{a^3}+12\frac{a'^2b''d}{a^3}+24\frac{a'^2b'd'}{a^3}-24\frac{a'^3b'd}{a^4}-24\frac{a'^3bd'}{a^4}+24\frac{a'a''b'd}{a^3}+24\frac{a'a''bd'}{a^3}$$

$$+8\frac{a'a'''bd}{a^3}-36\frac{a'^2a''bd}{a^4}+24\frac{a'^4bd}{a^5}\Bigg)$$

$$+6\varphi_3'\left(+\frac{a'''''c}{b}+5\frac{a''''c'}{b}+5\frac{a'c''''}{b}+\frac{ac'''''}{b}+10\frac{a'''c''}{b}+10\frac{a''c'''}{b}-20\frac{a'''b'c'}{b^2}-20\frac{a'b'''c'}{b^2}\right.$$

$$-20\frac{a'b'c'''}{b^2}-5\frac{ab'c''''}{b^2}-5\frac{ab''''c'}{b^2}-5\frac{a'b''''c}{b^2}-5\frac{a''''b'c}{b^2}-30\frac{a'b''c''}{b^2}-30\frac{a''b'c''}{b^2}-30\frac{a''b''c'}{b^2}$$

$$-10\frac{ab'''c''}{b^2}-10\frac{ab''c'''}{b^2}-10\frac{a'''b''c}{b^2}-10\frac{a''b'''c}{b^2}-\frac{ab'''''c}{b^2}+10\frac{ab'b''''c}{b^3}+20\frac{ab'^2c'''}{b^3}+20\frac{a'''b'^2c}{b^3}$$

$$+30\frac{a'b''^2c}{b^3}+30\frac{ab''^2c'}{b^3}+60\frac{a'b'^2c''}{b^3}+60\frac{a''b'^2c'}{b^3}+120\frac{a'b'b''c'}{b^3}+40\frac{ab'b'''c'}{b^3}+40\frac{a'b'b'''c}{b^3}$$

$$+60\frac{a''b'b''c}{b^3}+60\frac{ab'b''c''}{b^3}+20\frac{ab''b'''c}{b^3}-90\frac{ab'b''^2c}{b^4}-60\frac{ab'^2b'''c}{b^4}$$

$$-60\frac{ab'^3c''}{b^4}-60\frac{a''b'^3c}{b^4}-120\frac{a'b'^3c'}{b^4}-180\frac{ab'^2b''c'}{b^4}-180\frac{a'b'^2b''c}{b^4}$$

$$+60\cdot 4\frac{ab'^3b''c}{b^5}+24\cdot 5\frac{ab'^4c'}{b^5}+24\cdot 5\frac{a'b'^4c}{b^5}-24\cdot 5\frac{ab'^5c}{b^6}$$

$$+\frac{b'''''d}{a}+5\frac{b''''d'}{a}+5\frac{b'd''''}{a}+\frac{bd'''''}{a}+10\frac{b''d'''}{a}+10\frac{b'''d''}{a}-20\frac{a'''b'd'}{a^2}-20\frac{a'b'''d'}{a^2}$$

$$-20\frac{a'b'd'''}{a^2}-5\frac{a'bd''''}{a^2}-5\frac{a'b''''d}{a^2}-5\frac{a''''bd'}{a^2}-5\frac{a''''b'd}{a^2}-30\frac{a'b''d''}{a^2}-30\frac{a''b''d'}{a^2}-30\frac{a''b'd''}{a^2}$$

$$-10\frac{a'''bd''}{a^2}-10\frac{a''bd'''}{a^2}-10\frac{a'''b''d}{a^2}-10\frac{a''b'''d}{a^2}-\frac{a'''''bd}{a^2}+10\frac{a'a''''bd}{a^3}+20\frac{a'^2bd'''}{a^3}+20\frac{a'^2b'''d}{a^3}$$

$$-10\frac{a'''bd''}{a^2}-10\frac{a''bd'''}{a^2}-10\frac{a'''b''d}{a^2}-10\frac{a''b'''d}{a^2}-\frac{a'''''bd}{a^2}+10\frac{a'a''''bd}{a^3}+20\frac{a'^2bd'''}{a^3}+20\frac{a'^2b'''d}{a^3}$$

$$+30\frac{a''^2b'd}{a^3}+30\frac{a''^2bd'}{a^3}+60\frac{a'^2b''d'}{a^3}+60\frac{a'^2b'd''}{a^3}+120\frac{a'a''b'd'}{a^3}+40\frac{a'a'''bd'}{a^3}+40\frac{a'a'''b'd}{a^3}$$

$$+60\frac{a'a''b''d}{a^3}+60\frac{a'a''bd''}{a^3}+20\frac{a''a'''bd}{a^3}-90\frac{a'a''^2bd}{a^4}-60\frac{a'^2a'''bd}{a^4}$$

$$-60\frac{a'^3bd''}{a^4}-60\frac{a'^3b''d}{a^4}-24\cdot5\frac{a'^3b'd'}{a^4}-30\cdot6\frac{a'^2a''b'd}{a^4}-30\cdot6\frac{a'^2a''bd'}{a^4}$$

$$\left.+60\cdot4\frac{a'^3a''bd}{a^5}+24\cdot5\frac{a'^4b'd}{a^5}+24\cdot5\frac{a'^4bd'}{a^5}-24\cdot5\frac{a'^5bd}{a^6}\right)$$

$$+\varphi_3\left(+\frac{a''''''c}{b}-\frac{ab''''''c}{b^2}+\frac{ac''''''}{b}+6\frac{a'c'''''}{b}-6\frac{a'''''b'c}{b^2}+6\frac{a'''''c'}{b}-6\frac{ab'c'''''}{b^2}-6\frac{a'b'''''c}{b^2}-6\frac{ab'''''c'}{b^2}\right.$$

$$+12\frac{ab'b'''''c}{b^3}+15\frac{a''''c''}{b}+15\frac{a''c''''}{b}-15\frac{a''b''''c}{b^2}-15\frac{a''''b''c}{b^2}-15\frac{ab''''c''}{b^2}-15\frac{ab''c''''}{b^2}+30\frac{ab''b''''c}{b^3}$$

$$-30\frac{a''''b'c'}{b^2}-30\frac{a'b''''c'}{b^2}-30\frac{a'b'c''''}{b^2}+30\frac{ab'^2c''''}{b^3}+30\frac{a''''b'^2c}{b^3}+60\frac{ab'b''''c'}{b^3}+60\frac{a'b'b''''c}{b^3}$$

$$-90\frac{ab'^2b''''c}{b^4}+20\frac{a'''c'''}{b}-20\frac{ab'''c'''}{b^2}-20\frac{a'''b'''c}{b^2}+20\frac{ab'''^2c}{b^3}$$

$$-60\frac{a'''b'c''}{b^2}-60\frac{a''b'c'''}{b^2}-60\frac{a'b''c'''}{b^2}-60\frac{a'''b''c'}{b^2}-60\frac{a''b'''c'}{b^2}-60\frac{a'b'''c''}{b^2}$$

$$+120\frac{ab'b'''c''}{b^3}+120\frac{ab'b''c'''}{b^3}+120\frac{a'''b'b''c}{b^3}+120\frac{a'b''b'''c}{b^3}+120\frac{ab''b'''c'}{b^3}+120\frac{a''b'b'''c}{b^3}$$

$$-360\frac{ab'b''b'''c}{b^4}+240\frac{a'b'b'''c'}{b^3}+120\frac{a'''b'^2c'}{b^3}+120\frac{a'b'^2c'''}{b^3}-120\frac{a'''b'^3c}{b^4}-120\frac{ab'^3c'''}{b^4}+480\frac{ab'^3b'''c}{b^5}$$

$$-360\frac{ab'^2b'''c'}{b^4}-360\frac{a'b'^2b'''c}{b^4}-90\frac{a''b''c''}{b^2}+90\frac{a''b''^2c}{b^3}+90\frac{ab''^2c''}{b^3}-90\frac{ab''^3c}{b^4}$$

$$+180\frac{a'b''^2c'}{b^3}+180\frac{a''b'^2c''}{b^3}-540\frac{ab'^2b''c''}{b^4}-540\frac{a''b'^2b''c}{b^4}-540\frac{a'b'b''^2c}{b^4}-540\frac{ab'b''^2c'}{b^4}$$

$$+360\frac{a'b'b''c''}{b^3}+360\frac{a''b'b''c'}{b^3}+1080\frac{ab'^2b''^2c}{b^5}-360\frac{a''b'^3c'}{b^4}-360\frac{a'b'^3c''}{b^4}+360\frac{ab'^4c''}{b^5}+360\frac{a''b'^4c}{b^5}$$

$$-1080\frac{a'b'^2b''c'}{b^4}+1440\frac{ab'^3b''c'}{b^5}+1440\frac{a'b'^3b''c}{b^5}-1800\frac{ab'^4b''c}{b^6}$$

$$+720\frac{a'b'^4c'}{b^5}-720\frac{ab'^5c'}{b^6}-720\frac{a'b'^5c}{b^6}+720\frac{ab'^6c}{b^7}$$

$$-\frac{a''''''bd}{a^2}+\frac{b''''''d}{a}+\frac{bd''''''}{a}+6\frac{b'd'''''}{a}+6\frac{b'''''d'}{a}-6\frac{a'''''bd'}{a^2}-6\frac{a'bd'''''}{a^2}-6\frac{a'''''b'd}{a^2}-6\frac{a'b'''''d}{a^2}$$

$$+12\frac{a'a'''''bd}{a^3}+15\frac{b''''d''}{a}+15\frac{b''d''''}{a}-15\frac{a''''bd''}{a^2}-15\frac{a''b''''d}{a^2}-15\frac{a''bd''''}{a^2}-15\frac{a''''b''d}{a^2}+30\frac{a''a''''bd}{a^3}$$

$$-30\frac{a''''b'd'}{a^2}-30\frac{a'b''''d'}{a^2}-30\frac{a'b'd''''}{a^2}+30\frac{{a'}^2bd''''}{a^3}+30\frac{{a'}^2b''''d}{a^3}+60\frac{a'a''''b'd}{a^3}+60\frac{a'a''''bd'}{a^3}$$

$$-90\frac{{a'}^2a''''bd}{a^4}+20\frac{b'''d'''}{a}-20\frac{a'''b'''d}{a^2}-20\frac{a'''bd'''}{a^2}+20\frac{{a'''}^2bd}{a^3}$$

$$-60\frac{a'b''d'''}{a^2}-60\frac{a'b'''d''}{a^2}-60\frac{a'''b''d'}{a^2}-60\frac{a'''b'd''}{a^2}-60\frac{a''b'''d'}{a^2}-60\frac{a''b'd'''}{a^2}$$

$$+120\frac{a'a'''bd''}{a^3}+120\frac{a'a'''b''d}{a^3}+120\frac{a'a''bd'''}{a^3}+120\frac{a'a''b'''d}{a^3}+120\frac{a''a'''b'd}{a^3}+120\frac{a''a'''bd'}{a^3}$$

$$-360\frac{a'a''a'''bd}{a^4}+240\frac{a'a'''b'd'}{a^3}+120\frac{{a'}^2b'd'''}{a^3}+120\frac{{a'}^2b'''d'}{a^3}-120\frac{{a'}^3bd'''}{a^4}-120\frac{{a'}^3b'''d}{a^4}+480\frac{{a'}^3a'''bd}{a^5}$$

$$-360\frac{{a'}^2a'''b'd}{a^4}-360\frac{{a'}^2a'''bd'}{a^4}-90\frac{a''b''d''}{a^2}+90\frac{{a''}^2bd''}{a^3}+90\frac{{a''}^2b''d}{a^3}-90\frac{{a''}^3bd}{a^4}$$

$$+180\frac{{a'}^2b''d''}{a^3}+180\frac{{a''}^2b'd'}{a^3}-540\frac{{a'}^2a''b''d}{a^4}-540\frac{{a'}^2a''bd''}{a^4}-540\frac{a'{a''}^2b'd}{a^4}-540\frac{a'{a''}^2bd'}{a^4}$$

$$+360\frac{a'a''b'd''}{a^3}+360\frac{a'a''b''d'}{a^3}+1080\frac{{a'}^2{a''}^2bd}{a^5}-360\frac{{a'}^3b''d'}{a^4}-360\frac{{a'}^3b'd''}{a^4}+360\frac{{a'}^4bd''}{a^5}+360\frac{{a'}^4b''d}{a^5}$$

$$==$$

$$-1080\frac{{a'}^2a''b'd'}{a^4}+1440\frac{{a'}^3a''b'd}{a^5}+1440\frac{{a'}^3a''bd'}{a^5}-1800\frac{{a'}^4a''bd}{a^6}$$

$$+720\frac{{a'}^4b'd'}{a^5}-720\frac{{a'}^5b'd}{a^6}-720\frac{{a'}^5bd'}{a^6}+720\frac{{a'}^6bd}{a^7}\Bigg)$$

$$\Bigg(\frac{a''''''c}{d}+\frac{ac''''''}{d}-\frac{acd''''''}{d^2}+6\frac{a'''''c'}{d}+6\frac{a'c'''''}{d}-6\frac{ac'd'''''}{d^2}-6\frac{a'''''cd'}{d^2}-6\frac{ac'''''d'}{d^2}-6\frac{a'cd'''''}{d^2}$$

$$+12\frac{acd'd'''''}{d^3}+15\frac{a''''c''}{d}+15\frac{a''c''''}{d}-15\frac{ac''''d''}{d^2}-15\frac{a''''cd''}{d^2}-15\frac{ac''d''''}{d^2}-15\frac{a''cd''''}{d^2}+30\frac{acd''d''''}{d^3}$$

$$-30\frac{a''''c'd'}{d^2}-30\frac{a'c''''d'}{d^2}-30\frac{a'c'd''''}{d^2}+30\frac{a''''cd'^2}{d^3}+30\frac{ac''''d'^2}{d^3}+60\frac{ac'd'd''''}{d^3}+60\frac{a'cd'd''''}{d^3}$$

$$-90\frac{acd'^2d''''}{d^4}+20\frac{a'''c'''}{d}-20\frac{a'''cd'''}{d^2}-20\frac{ac'''d'''}{d^2}+20\frac{acd'''^2}{d^3}$$

$$-60\frac{a'c''d'''}{d^2}-60\frac{a'c'''d''}{d^2}-60\frac{a''c'd'''}{d^2}-60\frac{a''c'''d'}{d^2}-60\frac{a'''c''d'}{d^2}-60\frac{a'''c'd''}{d^2}$$

$$+120\frac{a'''cd'd''}{d^3}+120\frac{a''cd'd'''}{d^3}+120\frac{ac'''d'd''}{d^3}+120\frac{ac''d'd'''}{d^3}+120\frac{ac'd''d'''}{d^3}+120\frac{a'cd''d'''}{d^3}$$

$$-360\frac{acd'd''d'''}{d^4}+240\frac{a'c'd'd'''}{d^3}+120\frac{a'''c'd'^2}{d^3}+120\frac{a'c'''d'^2}{d^3}-120\frac{a'''cd'^3}{d^4}-120\frac{ac'''d'^3}{d^4}+480\frac{acd'^3d'''}{d^5}$$

$$-360\frac{a'cd'^2d'''}{d^4}-360\frac{ac'd'^2d'''}{d^4}-90\frac{a''c''d''}{d^2}+90\frac{a''cd''^2}{d^3}+90\frac{ac''d''^2}{d^3}-90\frac{acd''^3}{d^4}$$

$$+180\frac{a''c''d'^2}{d^3}+180\frac{a'c'd''^2}{d^3}-540\frac{ac'd'd''^2}{d^4}-540\frac{a'cd'd''^2}{d^4}-540\frac{a''cd'^2d''}{d^4}-540\frac{ac''d'^2d''}{d^4}$$

$$+360\frac{a'c''d'd''}{d^3}+360\frac{a''c'd'd''}{d^3}+1080\frac{acd'^2d''^2}{d^5}-360\frac{a''c'd'^3}{d^4}-360\frac{a'c''d'^3}{d^4}+360\frac{ac''d'^4}{d^5}+360\frac{a''cd'^4}{d^5}$$

$$-1080\frac{a'c'd'^2d''}{d^4}+60\cdot 24\frac{ac'd'^3d''}{d^5}+60\cdot 24\frac{a'cd'^3d''}{d^5}-60\cdot 30\frac{acd'^4d''}{d^6}$$

$$+24\cdot 30\frac{a'c'd'^4}{d^5}-24\cdot 30\frac{ac'd'^5}{d^6}-24\cdot 30\frac{a'cd'^5}{d^6}+24\cdot 30\frac{acd'^6}{d^7}\Bigg)$$

$$+\left(\frac{b''''''d}{c}-\frac{bc''''''d}{c^2}+\frac{bd''''''}{c}+6\frac{b'''''d'}{c}+6\frac{b'd'''''}{c}-6\frac{bc'd'''''}{c^2}-6\frac{bc'''''d'}{c^2}-6\frac{b'''''c'd}{c^2}-6\frac{b'c'''''d}{c^2}\right.$$

$$+12\frac{bc'c'''''d}{c^3}+15\frac{b''''d''}{c}+15\frac{b''d''''}{c}-15\frac{b''c''''d}{c^2}-15\frac{bc''d''''}{c^2}-15\frac{bc''''d''}{c^2}-15\frac{b''''c''d}{c^2}+30\frac{bc''c''''d}{c^3}$$

$$-30\frac{b''''c'd'}{c^2}-30\frac{b'c''''d'}{c^2}-30\frac{b'c'd''''}{c^2}+30\frac{b''''c'^2d}{c^3}+30\frac{bc'^2d''''}{c^3}+60\frac{bc'c''''d'}{c^3}+60\frac{b'c'c''''d}{c^3}$$

$$-90\frac{bc'^2c''''d}{c^4}+20\frac{b'''d'''}{c}-20\frac{bc'''d'''}{c^2}-20\frac{b'''c'''d}{c^2}+20\frac{bc'''^2d}{c^3}$$

$$-60\frac{b''c'd'''}{c^2}-60\frac{b'''c''d'}{c^2}-60\frac{b'''c'd''}{c^2}-60\frac{b''c'''d'}{c^2}-60\frac{b'c'''d''}{c^2}-60\frac{b'c''d'''}{c^2}$$

$$+120\frac{b'''c'c''d}{c^3}+120\frac{b''c'c'''d}{c^3}+120\frac{bc'c'''d''}{c^3}+120\frac{bc'c''d'''}{c^3}+120\frac{bc''c'''d'}{c^3}+120\frac{b'c''c'''d}{c^3}$$

$$-360\frac{bc'c''c'''d}{c^4}+240\frac{b'c'c'''d'}{c^3}+120\frac{b'c'^2d'''}{c^3}+120\frac{b'''c'^2d'}{c^3}-120\frac{bc'^3d'''}{c^4}-120\frac{b'''c'^3d}{c^4}+480\frac{bc'^3c'''d}{c^5}$$

$$-360\frac{b'c'^2c'''d}{c^4}-360\frac{bc'^2c'''d'}{c^4}-90\frac{b''c''d''}{c^2}+90\frac{bc''^2d''}{c^3}+90\frac{b''c''^2d}{c^3}-90\frac{bc''^3d}{c^4}$$

$$+180\frac{b''c'^2d''}{c^3}+180\frac{b'c''^2d'}{c^3}-540\frac{b'c'c''^2d}{c^4}-540\frac{bc'c''^2d'}{c^4}-540\frac{bc'^2c''d''}{c^4}-540\frac{b''c'^2c''d}{c^4}$$

$$+360\frac{b'c'c''d''}{c^3}+360\frac{b''c'c''d'}{c^3}+1080\frac{bc'^2c''^2d}{c^5}-360\frac{b'c'^3d''}{c^4}-360\frac{b''c'^3d'}{c^4}+360\frac{b''c'^4d}{c^5}+360\frac{bc'^4d''}{c^5}$$

$$-1080\frac{b'c'^2c''d'}{c^4}+60\cdot 24\frac{b'c'^3c''d}{c^5}+60\cdot 24\frac{bc'^3c''d'}{c^5}-60\cdot 30\frac{bc'^4c''d}{c^6}$$

$$\left.+24\cdot 30\frac{b'c'^4d'}{c^5}-24\cdot 30\frac{b'c'^5d}{c^6}-24\cdot 30\frac{bc'^5d'}{c^6}+24\cdot 30\frac{bc'^6d}{c^7}\right)$$

$$+6\left(-\frac{a'''''bd}{a^2c}+\frac{b'''''d}{ac}-\frac{bc'''''d}{ac^2}+\frac{bd'''''}{ac}+5\frac{b'd''''}{ac}+5\frac{b''''d'}{ac}-5\frac{a''''bd'}{a^2c}-5\frac{a''''b'd}{a^2c}-5\frac{a'b''''d}{a^2c}\right.$$

$$-5\frac{a'bd''''}{a^2c}-5\frac{b'c''''d}{ac^2}-5\frac{b''''c'd}{ac^2}-5\frac{bc'd''''}{ac^2}-5\frac{bc''''d'}{ac^2}+5\frac{a''''bc'd}{a^2c^2}+5\frac{a'bc''''d}{a^2c^2}+10\frac{a'a''''bd}{a^3c}$$

$$+10\frac{bc'c''''d}{ac^3}+10\frac{b'''d''}{ac}+10\frac{b''d'''}{ac}-10\frac{a'''bd''}{a^2c}-10\frac{a'''b''d}{a^2c}-10\frac{a''b'''d}{a^2c}-10\frac{a''bd'''}{a^2c}-10\frac{bc'''d''}{ac^2}$$

$$-10\frac{b'''c''d}{ac^2}-10\frac{bc''d'''}{ac^2}-10\frac{b''c'''d}{ac^2}+10\frac{a'''bc''d}{a^2c^2}+10\frac{a''bc'''d}{a^2c^2}+20\frac{a''a'''bd}{a^3c}+20\frac{bc''c'''d}{ac^3}$$

$$-20\frac{a'b'''d'}{a^2c}-20\frac{a'b'd'''}{a^2c}-20\frac{a'''b'd'}{a^2c}-20\frac{b'c'd'''}{ac^2}-20\frac{b'''c'd'}{ac^2}-20\frac{b'c'''d'}{ac^2}$$

$$+20\frac{a'^2b'''d}{a^3c}+20\frac{a'^2bd'''}{a^3c}+20\frac{bc'^2d'''}{ac^3}+20\frac{b'''c'^2d}{ac^3}+20\frac{a'''b'c'd}{a^2c^2}+20\frac{a'''bc'd'}{a^2c^2}$$

$$+20\frac{a'b'''c'd}{a^2c^2}+20\frac{a'bc'd'''}{a^2c^2}+20\frac{a'b'c'''d}{a^2c^2}+20\frac{a'bc'''d'}{a^2c^2}-20\frac{a'''bc'^2d}{a^2c^3}-20\frac{a'^2bc'''d}{a^3c^2}$$

$$+40\frac{a'a'''bd'}{a^3c}+40\frac{a'a'''b'd}{a^3c}+40\frac{bc'c'''d'}{ac^3}+40\frac{b'c'c'''d}{ac^3}-40\frac{a'a'''bc'd}{a^3c^2}-40\frac{a'bc'c'''d}{a^2c^3}$$

$$-60\frac{a'^2a'''bd}{a^4c}-60\frac{bc'^2c'''d}{ac^4}$$

$$-30\frac{a''b''d'}{a^2c}-30\frac{a''b'd''}{a^2c}-30\frac{a'b''d''}{a^2c}-30\frac{b''c''d'}{ac^2}-30\frac{b'c''d''}{ac^2}-30\frac{b''c'd''}{ac^2}$$

$$+30\frac{a''^2b'd}{a^3c}+30\frac{a''^2bd'}{a^3c}+30\frac{b'c''^2d}{ac^3}+30\frac{bc''^2d'}{ac^3}-30\frac{a''^2bc'd}{a^3c^2}-30\frac{a'bc''^2d}{a^2c^3}$$

$$+30\frac{a''b''c'd}{a^2c^2}+30\frac{a'bc''d''}{a^2c^2}+30\frac{a''bc'd''}{a^2c^2}+30\frac{a'b''c''d}{a^2c^2}+30\frac{a''b'c''d}{a^2c^2}+30\frac{a''bc''d'}{a^2c^2}$$

$$+60\frac{a'a''b''d}{a^3c}+60\frac{a'a''bd''}{a^3c}+60\frac{b''c'c''d}{ac^3}+60\frac{bc'c''d''}{ac^3}-60\frac{a'a''bc''d}{a^3c^2}-60\frac{a''bc'c''d}{a^2c^3}$$

$$-90\frac{a'a''^2bd}{a^4c}-90\frac{bc'c''^2d}{ac^4}$$

$$+60\frac{a''b'c'd'}{a^2c^2}+60\frac{a'b''c'd'}{a^2c^2}+60\frac{a'b'c''d'}{a^2c^2}+60\frac{a'b'c'd''}{a^2c^2}$$

$$+60\frac{a'^2b''d'}{a^3c}+60\frac{a'^2b'd''}{a^3c}+60\frac{b''c'^2d'}{ac^3}+60\frac{b'c'^2d''}{ac^3}-60\frac{a'^3b''d}{a^4c}-60\frac{a'^3bd''}{a^4c}-60\frac{bc'^3d''}{ac^4}-60\frac{b''c'^3d}{ac^4}$$

$$-60\frac{a'^2b''c'd}{a^3c^2}-60\frac{a'^2bc'd''}{a^3c^2}-60\frac{a'^2bc''d'}{a^3c^2}-60\frac{a'bc'^2d''}{a^2c^3}-60\frac{a''b'c'^2d}{a^2c^3}-60\frac{a''bc'^2d'}{a^2c^3}$$

$$-60\frac{a'b''c'^2d}{a^2c^3}-60\frac{a'^2b'c''d}{a^3c^2}+60\frac{a''bc'^3d}{a^2c^4}+60\frac{a'^3bc''d}{a^4c^2}$$

$$-180\frac{a'^2a''b'd}{a^4c}-180\frac{a'^2a''bd'}{a^4c}-180\frac{b'c'^2c''d}{ac^4}-180\frac{bc'^2c''d'}{ac^4}+180\frac{a'^2a''bc'd}{a^4c^2}+180\frac{a'bc'^2c''d}{a^2c^4}$$

$$-120\frac{a'a''b'c'd}{a^3c^2}-120\frac{a'a''bc'd'}{a^3c^2}-120\frac{a'bc'c''d'}{a^2c^3}-120\frac{a'b'c'c''d}{a^2c^3}+120\frac{a'a''b'd'}{a^3c}+120\frac{b'c'c''d'}{ac^3}$$

$$+120\frac{a'^2bc'c''d}{a^3c^3}+120\frac{a'a''bc'^2d}{a^3c^3}+240\frac{a'^3a''bd}{a^5c}+240\frac{bc'^3c''d}{ac^5}$$

$$-120\frac{a'b'c'^2d'}{a^2c^3}-120\frac{b'c'^3d'}{ac^4}-120\frac{a'^3b'd'}{a^4c}-120\frac{a'^2b'c'd'}{a^3c^2}+120\frac{a'^2b'c'^2d}{a^3c^3}+120\frac{a'^2bc'^2d'}{a^3c^3}$$

$$-120\frac{a'^2bc'^3d}{a^3c^4}-120\frac{a'^3bc'^2d}{a^4c^3}+120\frac{a'^3bc'd'}{a^4c^2}+120\frac{a'^3b'c'd}{a^4c^2}+120\frac{a'b'c'^3d}{a^2c^4}+120\frac{a'bc'^3d'}{a^2c^4}$$

$$+120\frac{a'^4b'd}{a^5c}+120\frac{a'^4bd'}{a^5c}+120\frac{b'c'^4d}{ac^5}+120\frac{bc'^4d'}{ac^5}$$

$$-120\frac{a'bc'^4d}{a^2c^5}-120\frac{a'^4bc'd}{a^5c^2}-120\frac{a'^5bd}{a^6c}-120\frac{bc'^5d}{ac^6}$$

$$
-\frac{a'''''c}{bd}+\frac{ab'''''c}{b^2d}-\frac{ac'''''}{bd}+\frac{acd'''''}{bd^2}-5\frac{a''''c'}{bd}-5\frac{a'c''''}{bd}+5\frac{ab'c''''}{b^2d}+5\frac{ac''''d'}{bd^2}+5\frac{ab''''c'}{b^2d}
$$

$$
+5\frac{a'cd''''}{bd^2}+5\frac{ac'd''''}{bd^2}-5\frac{ab'cd''''}{b^2d^2}+5\frac{a''''b'c}{b^2d}+5\frac{a''''cd'}{bd^2}+5\frac{a'b''''c}{b^2d}-5\frac{ab''''cd'}{b^2d^2}-10\frac{ab'b''''c}{b^3d}
$$

$$
-10\frac{acd'd''''}{bd^3}-10\frac{a''c'''}{bd}-10\frac{a'''c''}{bd}+10\frac{ac'''d''}{bd^2}+10\frac{a'''cd''}{bd^2}+10\frac{ab''c'''}{b^2d}+10\frac{a''cd'''}{bd^2}+10\frac{ac''d'''}{bd^2}
$$

$$
+10\frac{ab'''c''}{b^2d}+10\frac{a''b'''c}{b^2d}+10\frac{a'''b''c}{b^2d}-10\frac{ab'''cd''}{b^2d^2}-10\frac{ab''cd'''}{b^2d^2}-20\frac{acd''d'''}{bd^3}-20\frac{ab''b'''c}{b^3d}
$$

$$
+20\frac{a'''b'c'}{b^2d}+20\frac{a'b'''c'}{b^2d}+20\frac{a'b'c'''}{b^2d}+20\frac{a'''c'd'}{bd^2}+20\frac{a'c'''d'}{bd^2}+20\frac{a'c'd'''}{bd^2}
$$

$$
-20\frac{a'''b'^2c}{b^3d}-20\frac{ab'^2c'''}{b^3d}-20\frac{a'''cd'^2}{bd^3}-20\frac{ac'''d'^2}{bd^3}+20\frac{ab'''cd'^2}{b^2d^3}+20\frac{ab'^2cd'''}{b^3d^2}
$$

$$
-20\frac{a'''b'cd'}{b^2d^2}-20\frac{a'b'''cd'}{b^2d^2}-20\frac{ab'''c'd'}{b^2d^2}-20\frac{ab'c'''d'}{b^2d^2}-20\frac{a'b'cd'''}{b^2d^2}-20\frac{ab'c'd'''}{b^2d^2}
$$

$$
-40\frac{a'b'b'''c}{b^3d}-40\frac{ab'b'''c'}{b^3d}-40\frac{a'cd'd'''}{bd^3}-40\frac{ac'd'd'''}{bd^3}+40\frac{ab'cd'd'''}{b^2d^3}+40\frac{ab'b'''cd'}{b^3d^2}
$$

$$
+60\frac{acd'^2d'''}{bd^4}+60\frac{ab'^2b'''c}{b^4d}
$$

$$
+30\frac{a''b'c''}{b^2d}+30\frac{a'b''c''}{b^2d}+30\frac{a''b''c'}{b^2d}+30\frac{a''c''d'}{bd^2}+30\frac{a''c'd''}{bd^2}+30\frac{a'c''d''}{bd^2}
$$

$$
-30\frac{a'b''^2c}{b^3d}-30\frac{ab''^2c'}{b^3d}-30\frac{a'cd''^2}{bd^3}-30\frac{ac'd''^2}{bd^3}+30\frac{ab'cd''^2}{b^2d^3}+30\frac{ab''^2cd'}{b^3d^2}
$$

$$
-30\frac{ab''c''d'}{b^2d^2}-30\frac{a''b''cd'}{b^2d^2}-30\frac{a''b'cd''}{b^2d^2}-30\frac{ab'c''d''}{b^2d^2}-30\frac{a'b''cd''}{b^2d^2}-30\frac{ab''c'd''}{b^2d^2}
$$

$$
-60\frac{ac''d'd''}{bd^3}-60\frac{a''cd'd''}{bd^3}-60\frac{a''b'b''c}{b^3d}-60\frac{ab'b''c''}{b^3d}+60\frac{ab''cd'd''}{b^2d^3}+60\frac{ab'b''cd''}{b^3d^2}
$$

$$
+90\frac{acd'd''^2}{bd^4}+90\frac{ab'b''^2c}{b^4d}
$$

$$-60\frac{a''b'c'd'}{b^2d^2}-60\frac{a'b''c'd'}{b^2d^2}-60\frac{a'b'c''d'}{b^2d^2}-60\frac{a'b'c'd''}{b^2d^2}$$

$$-60\frac{a''b'^2c'}{b^3d}-60\frac{a'b'^2c''}{b^3d}-60\frac{a''c'd'^2}{bd^3}-60\frac{a'c''d'^2}{bd^3}+60\frac{a''b'^3c}{b^4d}+60\frac{ab'^3c''}{b^4d}+60\frac{ac''d'^3}{bd^4}+60\frac{a''cd'^3}{bd^4}$$

$$+60\frac{a''b'cd'^2}{b^2d^3}+60\frac{ab'c''d'^2}{b^2d^3}+60\frac{a''b'^2cd'}{b^3d^2}+60\frac{ab'^2c''d'}{b^3d^2}+60\frac{a'b'^2cd''}{b^3d^2}+60\frac{ab'^2c'd''}{b^3d^2}$$

$$+60\frac{ab''c'd'^2}{b^2d^3}+60\frac{a'b''cd'^2}{b^2d^3}-60\frac{ab''cd'^3}{b^2d^4}-60\frac{ab'^3cd''}{b^4d^2}$$

$$+180\frac{ab'^2b''c'}{b^4d}+180\frac{a'b'^2b''c}{b^4d}+180\frac{ac'd'^2d''}{bd^4}+180\frac{a'cd'^2d''}{bd^4}-180\frac{ab'cd'^2d''}{b^2d^4}-180\frac{ab'^2b''cd'}{b^4d^2}$$

$$+120\frac{a'b'b''cd'}{b^3d^2}+120\frac{ab'b''c'd'}{b^3d^2}+120\frac{ab'c'd'd''}{b^2d^3}+120\frac{a'b'cd'd''}{b^2d^3}-120\frac{a'c'd'd''}{bd^3}-120\frac{a'b'b''c'}{b^3d}$$

$$-120\frac{ab'b''cd'^2}{b^3d^3}-120\frac{ab'^2cd'd''}{b^3d^3}-240\frac{acd'^3d''}{bd^5}-240\frac{ab'^3b''c}{b^5d}$$

$$-120\frac{a'b'^2cd'^2}{b^3d^3}-120\frac{a'b'cd'^3}{b^2d^4}+120\frac{a'b'c'd'^2}{b^2d^3}-120\frac{ab'^2c'd'^2}{b^3d^3}-120\frac{ab'c'd'^3}{b^2d^4}+120\frac{a'b'^2c'd'}{b^3d^2}$$

$$+120\frac{a'c'd'^3}{bd^4}+120\frac{a'b'^3c'}{b^4d}-120\frac{ab'^3c'd'}{b^4d^2}-120\frac{a'b'^3cd'}{b^4d^2}+120\frac{ab'^2cd'^3}{b^3d^4}+120\frac{ab'^3cd'^2}{b^4d^3}$$

$$-120\frac{a'cd'^4}{bd^5}-120\frac{ac'd'^4}{bd^5}-120\frac{a'b'^4c}{b^5d}-120\frac{ab'^4c'}{b^5d}$$

$$+120\frac{ab'^4cd'}{b^5d^2}+120\frac{ab'cd'^4}{b^2d^5}+120\frac{ab'^5c}{b^6d}+120\frac{acd'^5}{bd^6}\Bigg)$$

$$+v\frac{d^6}{dv^6}\left(\frac{bd}{ac}-\frac{ac}{bd}\right)$$

Therefore, when $v=0$ (it must be $a=b=c=d=C$ and then $\varphi_3\big|_{v=0}=\left[\dfrac{\dfrac{ac}{d}+\dfrac{bd}{c}+v\left(\dfrac{bd}{ac}-\dfrac{ac}{bd}\right)}{\dfrac{ac}{b}+\dfrac{bd}{a}}\right]\Bigg|_{v=0}=\left[\dfrac{2\dfrac{C^2}{C}+0}{2\dfrac{C^2}{C}}\right]$=1):

A. the 1① becomes $a'+b'=0$; the 1② becomes $-a''+2\dfrac{a'^2}{C}-b''+2\dfrac{b'^2}{C}=0$ because 1① i.e. $a'+b'=0$ then 1② becomes $a''+b''=-4\dfrac{a'b'}{C}$; the 1③ becomes $-\dfrac{a'''}{C^2}+6\dfrac{a'a''}{C^3}-6\dfrac{a'^3}{C^4}-\dfrac{b'''}{C^2}+6\dfrac{b''b'}{C^3}-6\dfrac{b'^3}{C^4}=0$ because $(a'^3+b'^3)=(a'+b')(a'^2-a'b'+b'^2)=0$ then 1③ becomes $a'''+b'''=6\dfrac{a'a''}{C}+6\dfrac{b''b'}{C}$; then 1④ becomes

$$-\frac{a''''}{C^2}+6\frac{a''^2}{C^3}+8\frac{a'a'''}{C^3}-36\frac{a'^2a''}{C^4}+24\frac{a'^4}{C^5}-\frac{b''''}{C^2}+8\frac{b'b'''}{C^3}+6\frac{b''^2}{C^3}-36\frac{b'^2b''}{C^4}+24\frac{b'^4}{C^5}=0$$

i.e.

$$a''''+b''''=\frac{6}{C}\left(a''^2+b''^2\right)+\frac{8}{C}\left(a'a'''+b'b'''\right)-\frac{36}{C^2}\left(a'^2a''+b'^2b''\right)+\frac{24}{C^3}\left(a'^4+b'^4\right);$$

the 1⑤ becomes

$$a'''''+b'''''=+10\frac{a'a''''}{C}+20\frac{a''a'''}{C}-45\cdot 2\frac{a'a''^2}{C^2}-60\frac{a'^2a'''}{C^2}+60\cdot 4\frac{a'^3a''}{C^3}-24\cdot 5\frac{a'^5}{C^4}$$

$$+10\frac{b'b''''}{C}+20\frac{b''b'''}{C}-45\cdot 2\frac{b'b''^2}{C^2}-60\frac{b'^2b'''}{C^2}+60\cdot 4\frac{b'^3b''}{C^3}-24\cdot 5\frac{b'^5}{C^4}$$

the 1⑥ becomes

$$a''''''+b''''''=12\frac{a'a'''''}{C}+30\frac{a''a''''}{C}-90\frac{a'^2a''''}{C^2}+20\frac{a'''^2}{C}+60\cdot 8\frac{a'^3a'''}{C^3}-9\cdot 10\cdot 4\frac{a'a''a'''}{C^2}$$

$$-45\cdot 2\frac{a''^3}{C^2}+45\cdot 24\frac{a'^2a''^2}{C^3}-60\cdot 5\cdot 6\frac{a'^4a''}{C^4}+24\cdot 6\cdot 5\frac{a'^6}{C^5}$$

$$12\frac{b'b'''''}{C}+30\frac{b''b''''}{C}-90\frac{b'^2b''''}{C^2}+20\frac{b'''^2}{C}+60\cdot 8\frac{b'^3b'''}{C^3}-9\cdot 10\cdot 4\frac{b'b''b'''}{C^2}$$

$$-45\cdot 2\frac{b''^3}{C^2}+45\cdot 24\frac{b'^2b''^2}{C^3}-60\cdot 5\cdot 6\frac{b'^4b''}{C^4}+24\cdot 6\cdot 5\frac{b'^6}{C^5}$$

B. the 2① becomes $c'+d'=0$, the 2② becomes $-c''+2\frac{c'^2}{C}-d''+2\frac{d'^2}{C}=0$ because 2① i.e. $c'+d'=0$ then 2② becomes $c''+d''=-4\frac{c'd'}{C}$, 2③becomes $-\frac{c'''}{C^2}+6\frac{c'c''}{C^3}-6\frac{c'^3}{C^4}-\frac{d'''}{C^2}+6\frac{d''d'}{C^3}-6\frac{d'^3}{C^4}=0$ as before $(c'^3+d'^3)=(c'+d')(c'^2-c'd'+d'^2)=0$ then 2③ becomes $c'''+d'''=6\frac{c'c''}{C}+6\frac{d''d'}{C}$; then 2④ becomes

$$-\frac{c''''}{C^2}+6\frac{c''^2}{C^3}+8\frac{c'c'''}{C^3}-36\frac{c'^2c''}{C^4}+24\frac{c'^4}{C^5}-\frac{d''''}{C^2}+8\frac{d'''d'}{C^3}+6\frac{d''^2}{C^3}-36\frac{d'^2d''}{C^4}+24\frac{d'^4}{C^5}=0$$

i.e. $c''''+d''''=\frac{6}{C}\left(c''^2+d''^2\right)+\frac{8}{C}\left(c'c'''+d'''d'\right)-\frac{36}{C^2}\left(c'^2c''+d'^2d''\right)+\frac{24}{C^3}\left(c'^4+d'^4\right);$

the 2⑤ becomes

$$c'''''+d'''''=+10\frac{c'c''''}{C}+20\frac{c''c'''}{C}-60\frac{c'^2c'''}{C^2}-45\cdot 2\frac{c'c''^2}{C^2}+60\cdot 4\frac{c'^3c''}{C^3}-24\cdot 5\frac{c'^5}{C^4}$$

$$+10\frac{d'd''''}{C}+20\frac{d'''d''}{C}-60\frac{d'''d'^2}{C^2}-45\cdot 2\frac{d'd''^2}{C^2}+60\cdot 4\frac{d'^3d''}{C^3}-24\cdot 5\frac{d'^5}{C^4}$$

the 2⑥ becomes

$$c'''''' + d'''''' = 12\frac{c'c'''''}{C} + 30\frac{c''c''''}{C} - 90\frac{c'^2c''''}{C^2} + 20\frac{c'''^2}{C} + 60\cdot 8\frac{c'^3c'''}{C^3} - 90\cdot 4\frac{c'c''c'''}{C^2}$$

$$-45\cdot 2\frac{c''^3}{C^2} + 45\cdot 24\frac{c'^2c''^2}{C^3} - 60\cdot 30\frac{c'^4c''}{C^4} + 24\cdot 30\frac{c'^6}{C^5}$$

$$12\frac{d'd'''''}{C} + 30\frac{d''d''''}{C} - 90\frac{d'^2d''''}{C^2} + 20\frac{d'''^2}{C} + 60\cdot 8\frac{d'^3d'''}{C^3} - 90\cdot 4\frac{d'd''d'''}{C^2}$$

$$-45\cdot 2\frac{d''^3}{C^2} + 45\cdot 24\frac{d'^2d''^2}{C^3} - 60\cdot 30\frac{d'^4d''}{C^4} + 24\cdot 30\frac{d'^6}{C^5}$$

C. the 3① becomes $-a'C + b'C + Cc' - Cd' - (C + C) = 0$ i.e. $-a' + b' + c' - d' = 2$, the 3② becomes $b'' + \frac{2b'c'}{C} + c'' - a'' - \frac{2a'd'}{C} - d'' - \frac{2(c'+d')}{C} = 0$ because 2① $c' + d' = 0$ then 3② becomes $-a'' + b'' + c'' - d'' = \frac{2(a'd' - b'c')}{C}$. 3③ i.e. $b'''c + bc''' - a'''d - ad''' = 3a''d' + 3a'd'' - 3b'c'' - 3b''c' + 3(c'' + d'') + v(c''' + d''')$ becomes $-a'''C + b'''C + Cc''' - Cd''' = 3a''d' + 3a'd'' - 3b'c'' - 3b''c' + 3(c'' + d'') + 0$ i.e.

$$-a''' + b''' + c''' - d''' = \frac{3[a''d' + a'd'' - b'c'' - b''c' + (c'' + d'')]}{C}$$

then 3④ becomes

$$-a''''C + b''''C + Cc'''' - Cd''''$$

$$= 4a'''d' + 3a''d'' + 3a''d'' + 4a'd''' - 6b''c'' - 4b'c''' - 4b'''c' + 4(c''' + d''') + 0$$

i.e.

$$-a'''' + b'''' + c'''' - d''''$$

$$= \frac{4(a'''d' + a'd''') + 6(a''d'' - b''c'') - 4(b'c''' + b'''c') + 4(c''' + d''')}{C}$$

the 3⑤ becomes

$$-a''''' + b''''' + c''''' - d''''' =$$

$$\frac{-5b''''c' - 10b'''c'' - 10b''c''' - 5b'c'''' + 5a''''d' + 10a'''d'' + 10a''d''' + 5a'd'''' + 5(c'''' + d'''')}{C}$$

the 3⑥ becomes

$$-a'''''' + b'''''' + c'''''' - d'''''' =$$

$$\frac{6a'''''d' + 6a'd''''' - 6b'''''c' - 6b'c''''' - 15b''''c'' - 20b'''c''' - 15b''c'''' + 15a''''d'' + 20a'''d'''}{C}$$

$$+\frac{15a''d'''' + 6(c''''' + d''''')}{C}$$

D. the 4① i.e. $(c' - d') + \frac{(C - C)}{2}\varphi_3' = \frac{1}{\sigma}(b' - a')$ becomes $\frac{1}{\sigma}a' - \frac{1}{\sigma}b' + c' - d' = 0$, the 4② becomes $(c'' - d'') + (c' - d')\varphi_3' = \frac{1}{\sigma}(b'' - a'')$, i.e. $\frac{1}{\sigma}a'' - \frac{1}{\sigma}b'' + c'' - d'' = (d' - c')\varphi_3'$; 4③ becomes

$$(c''' - d''') + (c'' - d'')\frac{\varphi_3'}{2} + (c'' - d'')\varphi_3' + (c' - d')\varphi_3'' + (c' - d')\varphi_3'^2\frac{(-1)}{2}$$

$$+ (c' - d')\frac{\varphi_3''}{2} + 0 + -(c' - d')\frac{\varphi_3'^2}{4} - 0 - 0 = \frac{1}{\sigma}(b''' - a''')$$

i.e.

$$\frac{1}{\sigma}a''' - \frac{1}{\sigma}b''' + c''' - d''' = (d'' - c'')\frac{3\varphi_3'}{2} + (c' - d')\varphi_3'^2\frac{3}{4} + (d' - c')\frac{3\varphi_3''}{2}$$

the 4④ becomes

$$(c'''' - d'''') + 6(c'' - d'')\frac{\varphi_3''}{2} + 4(c' - d')\frac{\varphi_3'''}{2} + (c - d)\left(\frac{\varphi_3''''}{2} - \frac{3\varphi_3''^2}{4}\right) = \frac{1}{\sigma}(b'''' - a'''')$$

When $v$=0 4④ becomes

$$\frac{1}{\sigma}a'''' - \frac{1}{\sigma}b'''' + c'''' - d_3''''= 3(d'' - c'')\varphi_3'' + 2(d' - c')\varphi'''$$

the 4⑤ becomes

$$\frac{1}{\sigma}a''''' - \frac{1}{\sigma}b''''' + (c''''' - d''''')$$

$$= -\left[+10(c''' - d''')\frac{\varphi_3''}{2} + 5(c' - d')\left(\frac{\varphi_3''''}{2} - \frac{3\varphi_3''^2}{4}\right) + (c - d)\left(\frac{\varphi_3'''''}{2} - \frac{10\varphi_3''\varphi_3'''}{4}\right)\right]$$

the 4⑥ becomes

$$(c'''''' - d'''''') + 15(c'''' - d'''')\frac{\varphi_3''}{2}$$

$$+ 15(c'' - d'')\left(\frac{\varphi_3''''}{2} - \frac{3\varphi_3''^2}{4}\right) + 6(c' - d')\left(\frac{\varphi_3'''''}{2\sqrt{\varphi_3}} - \frac{10\varphi_3''\varphi_3'''}{4(\sqrt{\varphi_3})^3}\right) = \frac{1}{\sigma}(b'''''' - a'''''')$$

i.e. $\frac{1}{\sigma}(-b'''''' + a'''''') + (c'''''' - d'''''') =$

$$-15(c'''' - d'''')\frac{\varphi_3''}{2} - 15(c'' - d'')\left(\frac{\varphi_3''''}{2} - \frac{3\varphi_3''^2}{4}\right) - 6(c' - d')\left(\frac{\varphi_3'''''}{2\sqrt{\varphi_3}} - \frac{10\varphi_3''\varphi_3'''}{4(\sqrt{\varphi_3})^3}\right)$$

E. the 5① becomes $\varphi_3' 2C + (a' + c' - b' + b' + d' - a') = a' + c' - d' + b' + d' - c' + 0 + 0$ i.e. 5①: $-a' - b' + d' + c' + \varphi_3' 2C = 0$.

Because 1① i.e. $a' + b' = 0$, 2① i.e. $c' + d' = 0$, and then we get 5① become $\varphi_3' 2C = 0$ and then 5② becomes

$$\varphi_3'' 2C + 0 + \left( a'' + 2\frac{a'c'}{C} + c'' - 2\frac{b'c'}{C} - 2\frac{a'b'}{C} - b'' + 2\frac{b'^2}{C}\right.$$

$$\left. + b'' + 2\frac{b'd'}{C} + d'' - a'' - 2\frac{a'b'}{C} - 2\frac{a'd'}{C} + 2\frac{a'^2}{C}\right)$$

$$=\left(a''+2\frac{a'c'}{C}+c''-2\frac{a'd'}{C}-2\frac{c'd'}{C}-d''+2\frac{d'^2}{C}\right)$$

$$+\left(b''+2\frac{b'd'}{C}+d''-2\frac{b'c'}{C}-c''-2\frac{c'd'}{C}+2\frac{c'^2}{C}\right)$$

$$+2\left(\frac{b'}{C}+\frac{d'}{C}-\frac{a'}{C}-\frac{c'}{C}-\frac{a'}{C}-\frac{c'}{C}+\frac{b'}{C}+\frac{d'}{C}\right)+0$$

Removed the same terms at both sides of the equal sign, merged the same kind term and taking note of that 1① i.e. $a'+b'=0$ and 2① i.e. $c'+d'=0$ the 5② becomes

$$\varphi_3''2C+\left(-8\frac{a'b'}{C}-a''\right)=-d''+b''-c''-8\frac{c'd'}{C}+4\left(-\frac{a'}{C}+\frac{b'}{C}-\frac{c'}{C}+\frac{d'}{C}\right)$$

i.e. 5②: $-a''-b''+c''+d''+\varphi_3''2C=\dfrac{8(a'b'-c'd')+4(-a'+b'-c'+d')}{C}$.

The 5③ becomes (please note that $\varphi_3=1$ and $\varphi_3'=0$ )

$$\varphi_3'''2C+3\varphi_3''(a'+c'-b'+b'+d'-a')+0$$

$$+\left(a'''+\frac{a''c'}{C}-\frac{a''b'}{C}+2\frac{a''c'}{C}+2\frac{a'c''}{C}-2\frac{a'b'c'}{C^2}+\frac{a'c''}{C}+c'''-\frac{b'c''}{C}\right.$$

$$-2\frac{a'b'c'}{C^2}-2\frac{b''c'}{C}-2\frac{b'c''}{C}+4\frac{b'^2c'}{C^2}-2\frac{a''b'}{C}-2\frac{a'b''}{C}-2\frac{a'b'c'}{C^2}+4\frac{a'b'^2}{C^2}$$

$$-\frac{a'b''}{C}-b'''-\frac{b''c'}{C}+2\frac{b'b''}{C^2}+2\frac{a'b'^2}{C^2}+4\frac{b'b''}{C}+2\frac{b'^2c'}{C^2}-6\frac{b'^3}{C^2}$$

$$+b'''+\frac{b''d'}{C}-\frac{a'b''}{C}+2\frac{b''d'}{C}+2\frac{b'd''}{C}-2\frac{a'b'd'}{C^2}+\frac{b'd''}{C}+d'''-\frac{a'd''}{C}$$

$$-a'''-\frac{a''b'}{C}-\frac{a''d'}{C}+2\frac{a'a''}{C}-2\frac{a''b'}{C}-2\frac{a'b''}{C}-2\frac{a'b'd'}{C^2}+4\frac{a'^2b'}{C^2}$$

$$\left.-2\frac{a''d'}{C}-2\frac{a'b'd'}{C^2}-2\frac{a'd''}{C}+4\frac{a'^2d'}{C^2}+4\frac{a'a''}{C}+2\frac{a'^2b'}{C^2}+2\frac{a'^2d'}{C^2}-6\frac{a'^3}{C^2}\right)$$

$$=\left(a'''+\frac{a''c'}{C}-\frac{a''d'}{C}+2\frac{a''c'}{C}+2\frac{a'c''}{C}-2\frac{a'c'd'}{C^2}+\frac{a'c''}{C}+c'''-\frac{c''d'}{C}\right.$$

$$-2\frac{a''d'}{C}-2\frac{a'c'd'}{C^2}-2\frac{a'd''}{C}+4\frac{a'd'^2}{C^2}-2\frac{a'c'd'}{C^2}-2\frac{c''d'}{C}-2\frac{c'd''}{C}+4\frac{c'd'^2}{C^2}$$

$$\left.-\frac{a'd''}{C}-\frac{c'd''}{C}-d'''+2\frac{d'd''}{C}+2\frac{a'd'^2}{C^2}+2\frac{c'd'^2}{C^2}+4\frac{d'd''}{C}-6\frac{d'^3}{C^2}\right)$$

$$+\left(b'''+\frac{b''d'}{C}-\frac{b''c'}{C}+2\frac{b''d'}{C}+2\frac{b'd''}{C}-2\frac{b'c'd'}{C^2}+\frac{b'd''}{C}+d'''-\frac{c'd''}{C}\right.$$

$$-2\frac{b''c'}{C}-2\frac{b'c''}{C}-2\frac{b'c'd'}{C^2}+4\frac{b'c'^2}{C^2}-\frac{b'c''}{C}-c'''-\frac{c''d'}{C}+2\frac{c''c'}{C}$$

$$-2\frac{b'c'd'}{C^2}-2\frac{c''d'}{C}-2\frac{c'd''}{C}+4\frac{c'^2d'}{C^2}+2\frac{b'c'^2}{C^2}+4\frac{c'c''}{C}+2\frac{c'^2d'}{C^2}-6\frac{c'^3}{C^2}\Bigg)$$

$$+3\Bigg(\frac{b''}{C}+\frac{b'd'}{C^2}-\frac{a'b'}{C^2}-\frac{b'c'}{C^2}+\frac{b'd'}{C^2}+\frac{d''}{C}-\frac{a'd'}{C^2}-\frac{c'd'}{C^2}$$

$$-\frac{a''}{C}-\frac{a'b'}{C^2}-\frac{a'd'}{C^2}+2\frac{a'^2}{C^2}+\frac{a'c'}{C^2}-\frac{b'c'}{C^2}-\frac{c''}{C}-\frac{c'd'}{C^2}+\frac{a'c'}{C^2}+2\frac{c'^2}{C^2}$$

$$-\frac{a''}{C}-\frac{a'c'}{C^2}+\frac{a'b'}{C^2}+\frac{a'd'}{C^2}-\frac{a'c'}{C^2}-\frac{c''}{C}+\frac{b'c'}{C^2}+\frac{c'd'}{C^2}$$

$$+\frac{a'b'}{C^2}+\frac{b''}{C}+\frac{b'c'}{C^2}-2\frac{b'^2}{C^2}-\frac{b'd'}{C^2}+\frac{a'd'}{C^2}+\frac{c'd'}{C^2}+\frac{d''}{C}-\frac{b'd'}{C^2}-2\frac{d'^2}{C^2}\Bigg)+0$$

Removed the same terms at both sides of the equal sign and merged the same kind terms the 5③ becomes

$$\varphi_3'''2C+3\varphi_3''(c'+d')+\Bigg(-6\frac{a'b'c'}{C^2}-3\frac{b''c'}{C}-3\frac{b'c''}{C}+4\frac{b'^2c'}{C^2}-6\frac{a''b'}{C}+6\frac{a'b'^2}{C^2}-6\frac{a'b''}{C}+6\frac{b'b''}{C}+2\frac{b'^2c'}{C^2}$$

$$-6\frac{b'^3}{C^2}+3\frac{b''d'}{C}+3\frac{b'd''}{C}+d'''-a'''+6\frac{a'^2b'}{C^2}-6\frac{a'b'd'}{C^2}+6\frac{a'^2d'}{C^2}+6\frac{a'a''}{C}-6\frac{a'^3}{C^2}\Bigg)$$

$$=\Bigg(-6\frac{a'c'd'}{C^2}+6\frac{a'd'^2}{C^2}-6\frac{c'd''}{C}+6\frac{c'd'^2}{C^2}+6\frac{d'd''}{C}-6\frac{d'^3}{C^2}\Bigg)+\Bigg(b'''+3\frac{b''d'}{C}+3\frac{b'd''}{C}$$

$$-3\frac{b''c'}{C}-3\frac{b'c''}{C}-c'''-6\frac{b'c'd'}{C^2}-6\frac{c''d'}{C}+6\frac{c'^2d'}{C^2}+6\frac{b'c'^2}{C^2}+6\frac{c'c''}{C}-6\frac{c'^3}{C^2}\Bigg)$$

$$+3\Bigg(-2\frac{a''}{C}+2\frac{b''}{C}-2\frac{c''}{C}+2\frac{d''}{C}+2\frac{a'^2}{C^2}-2\frac{b'^2}{C^2}+2\frac{c'^2}{C^2}-2\frac{d'^2}{C^2}\Bigg)$$

Taking note of that 1① $a'+b'=0$ and 2① $c'+d'=0$ then $a'^2-b'^2=(a'+b')(a'-b')=0$, $c'^2-d'^2=(c'+d')(c'-d')=0$, $(a'^3+b'^3)=(a'+b')(a'^2-a'b'+b'^2)=0$, $(c'^3+d'^3)=(c'+d')(c'^2-c'd'+d'^2)=0$ the 5③ becomes

$$-a'''-b'''+c'''+d'''+\varphi_3'''2C$$

$$=6\Bigg(\frac{-(a'-b')(a''-b'')+(c'-d')(c''-d'')}{C}+\frac{-a''+b''-c''+d''}{C}\Bigg)$$

$$+6\Bigg(\frac{a'd'(d'-a')+b'c'(c'-b')}{C^2}\Bigg)$$

The 5④ becomes (note when $v$=0 it must be $a=b=c=d=C$, $\varphi_3=1$ and $\varphi_3'=0$)

$$\varphi_3''''(2C)+4\varphi'''\ (+c'+d')$$

$$+6\varphi_3''\Bigg(+c''+d''-4\frac{a'b'}{C}+2\frac{a'c'}{C}-2\frac{a'd'}{C}-2\frac{b'c'}{C}+2\frac{b'd'}{C}+2\frac{a'^2}{C}+2\frac{b'^2}{C}\Bigg)$$

+0

$$
\begin{aligned}
&+\Bigg(a''''+\frac{a'''c'}{C}-\frac{a'''b'}{C}+3\frac{a'''c'}{C}+3\frac{a''c''}{C}-3\frac{a''b'c'}{C^2}+3\frac{a''c''}{C}\\
&+3\frac{a'c'''}{C}-3\frac{a'b'c''}{C^2}-6\frac{a''b'c'}{C^2}-6\frac{a'b''c'}{C^2}-6\frac{a'b'c''}{C^2}+12\frac{a'b'^2c'}{C^3}\\
&+\frac{a'c'''}{C}+c''''-\frac{b'c'''}{C}-3\frac{a'b''c'}{C^2}-3\frac{b'''c'}{C}-3\frac{b''c''}{C}+6\frac{b'b''c'}{C^2}\\
&-3\frac{a'b'c''}{C^2}-3\frac{b''c''}{C}-3\frac{b'c'''}{C}+6\frac{b'^2c''}{C^2}-3\frac{a'''b'}{C}-3\frac{a''b''}{C}\\
&-3\frac{a''b'c'}{C^2}+6\frac{a''b'^2}{C^2}+6\frac{a''b'^2}{C^2}+12\frac{a'b'b''}{C^2}+6\frac{a'b'^2c'}{C^3}-18\frac{a'b'^3}{C^3}\\
&+6\frac{a'b'^2c'}{C^3}+12\frac{b'b''c'}{C^2}+6\frac{b'^2c''}{C^2}-18\frac{b'^3c'}{C^3}-3\frac{a''b''}{C}-3\frac{a'b'''}{C}\\
&-3\frac{a'b''c'}{C^2}+6\frac{a'b'b''}{C^2}-\frac{a'b'''}{C}-b''''-\frac{b'''c'}{C}+2\frac{b'b'''}{C}\\
&+6\frac{a'b'b''}{C^2}+6\frac{b''^2}{C}+6\frac{b'b'''}{C}+6\frac{b'b''c'}{C^2}-18\frac{b'^2b''}{C^2}\\
&-6\frac{a'b'^3}{C^3}-18\frac{b'^2b''}{C^2}-6\frac{b'^3c'}{C^3}+24\frac{b'^4}{C^3}\\
&+b''''+\frac{b'''d'}{C}-\frac{a'b'''}{C}+3\frac{b'''d'}{C}+3\frac{b''d''}{C}-3\frac{a'b''d'}{C^2}\\
&-3\frac{a''b''}{C}-3\frac{a'b'''}{C}-3\frac{a'b''d'}{C^2}+6\frac{a'^2b''}{C^2}+3\frac{b''d''}{C}+3\frac{b'd'''}{C}-3\frac{a'b'd''}{C^2}\\
&+\frac{b'd'''}{C}+d''''-\frac{a'd'''}{C}-3\frac{a''d''}{C}-3\frac{a'b'd''}{C^2}-3\frac{a'd'''}{C}+6\frac{a'^2d''}{C^2}\\
&-a''''-\frac{a'''b'}{C}-\frac{a'''d'}{C}+2\frac{a'a'''}{C}-3\frac{a'''b'}{C}-3\frac{a''b''}{C}-3\frac{a''b'd'}{C^2}+6\frac{a'a''b'}{C^2}\\
&-3\frac{a'''d'}{C}-3\frac{a''b'd'}{C^2}-3\frac{a''d''}{C}+6\frac{a'a''d'}{C^2}-6\frac{a''b'd'}{C^2}-6\frac{a'b''d'}{C^2}-6\frac{a'b'd''}{C^2}+12\frac{a'^2b'd'}{C^3}\\
&+12\frac{a'a''d'}{C^2}+6\frac{a'^2b'd'}{C^3}+6\frac{a'^2d''}{C^2}-18\frac{a'^3d'}{C^3}+6\frac{a''^2}{C}+6\frac{a'a'''}{C}+6\frac{a'a''b'}{C^2}\\
&+6\frac{a'a''d'}{C^2}-18\frac{a'^2a''}{C^2}+12\frac{a'a''b'}{C^2}+6\frac{a'^2b''}{C^2}+6\frac{a'^2b'd'}{C^3}-18\frac{a'^3b'}{C^3}\\
&-18\frac{a'^2a''}{C^2}-6\frac{a'^3b'}{C^3}-6\frac{a'^3d'}{C^3}+24\frac{a'^4}{C^3}\Bigg)
\end{aligned}
$$

$$
\begin{aligned}
&=\Bigg(a'''' + \frac{a'''c'}{C} - \frac{a'''d'}{C} + 3\frac{a'''c'}{C} + 3\frac{a''c''}{C} - 3\frac{a''c'd'}{C^2} + 3\frac{a''c''}{C} + 3\frac{a'c'''}{C} - 3\frac{a'c''d'}{C^2}\\
&- 6\frac{a''c'd'}{C^2} - 6\frac{a'c''d'}{C^2} - 6\frac{a'c'd''}{C^2} + 12\frac{a'c'd'^2}{C^3} + \frac{a'c'''}{C} + c'''' - \frac{c'''d'}{C}\\
&- 3\frac{a'c''d'}{C^2} - 3\frac{c'''d'}{C} - 3\frac{c''d''}{C} + 6\frac{c''d'^2}{C^2} - 3\frac{a'''d'}{C} - 3\frac{a''c'd'}{C^2} - 3\frac{a''d''}{C} + 6\frac{a''d'^2}{C^2}\\
&- 3\frac{a''d''}{C} - 3\frac{a'c'd''}{C^2} - 3\frac{a'd'''}{C} + 6\frac{a'd'd''}{C^2} + 6\frac{a''d'^2}{C^2} + 6\frac{a'c'd'^2}{C^3} + 12\frac{a'd'd''}{C^2} - 18\frac{a'd'^3}{C^3}\\
&- 3\frac{a'c'd''}{C^2} - 3\frac{c''d''}{C} - 3\frac{c'd'''}{C} + 6\frac{c'd'd''}{C^2} + 6\frac{a'c'd'^2}{C^3} + 6\frac{c''d'^2}{C^2} + 12\frac{c'd'd''}{C^2} - 18\frac{c'd'^3}{C^3}\\
&- \frac{a'd'''}{C} - \frac{c'd'''}{C} - d'''' + 2\frac{d'd'''}{C} + 6\frac{a'd'd''}{C^2} + 6\frac{c'd'd''}{C^2} + 6\frac{d''^2}{C}\\
&+ 6\frac{d'd'''}{C} - 18\frac{d'^2d''}{C^2} - 6\frac{a'd'^3}{C^3} - 6\frac{c'd'^3}{C^3} - 18\frac{d'^2d''}{C^2} + 24\frac{d'^4}{C^3}\Bigg)\\
&+\Bigg(b'''' + \frac{b'''d'}{C} - \frac{b'''c'}{C} - 3\frac{b'''c'}{C} - 3\frac{b''c''}{C} - 3\frac{b''c'd'}{C^2} + 6\frac{b''c'^2}{C^2}\\
&+ 3\frac{b'''d'}{C} + 3\frac{b''d''}{C} - 3\frac{b''c'd'}{C^2} + 3\frac{b''d''}{C} + 3\frac{b'd'''}{C} - 3\frac{b'c'd''}{C^2} + \frac{b'd'''}{C} + d'''' - \frac{c'd'''}{C}\\
&- 3\frac{b'c'd''}{C^2} - 3\frac{c''d''}{C} - 3\frac{c'd'''}{C} + 6\frac{c'^2d''}{C^2} - 3\frac{b''c''}{C} - 3\frac{b'c'''}{C} - 3\frac{b'c''d'}{C^2} + 6\frac{b'c'c''}{C^2}\\
&+ 6\frac{b''c'^2}{C^2} + 12\frac{b'c'c''}{C^2} + 6\frac{b'c'^2d'}{C^3} - 18\frac{b'c'^3}{C^3} - \frac{b'c'''}{C} - c'''' - \frac{c'''d'}{C} + 2\frac{c'c'''}{C}\\
&- 3\frac{b'c''d'}{C^2} - 3\frac{c'''d'}{C} - 3\frac{c''d''}{C} + 6\frac{c'c''d'}{C^2} - 6\frac{b''c'd'}{C^2} - 6\frac{b'c''d'}{C^2} - 6\frac{b'c'd''}{C^2} + 12\frac{b'c'^2d'}{C^3}\\
&+ 6\frac{b'c'^2d'}{C^3} + 12\frac{c'c''d'}{C^2} + 6\frac{c'^2d''}{C^2} - 18\frac{c'^3d'}{C^3} + 6\frac{b'c'c''}{C^2} + 6\frac{c''^2}{C} + 6\frac{c'c'''}{C}\\
&+ 6\frac{c'c''d'}{C^2} - 18\frac{c'^2c''}{C^2} - 6\frac{b'c'^3}{C^3} - 18\frac{c'^2c''}{C^2} - 6\frac{c'^3d'}{C^3} + 24\frac{c'^4}{C^3}\Bigg)
\end{aligned}
$$

$$+4\left(\frac{b'''}{C}+\frac{b''d'}{C^2}-\frac{a'b''}{C^2}-\frac{b''c'}{C^2}+2\frac{b''d'}{C^2}+2\frac{b'd''}{C^2}-2\frac{a'b'd'}{C^3}-2\frac{b'c'd'}{C^3}\right.$$

$$+\frac{b'd''}{C^2}+\frac{d'''}{C}-\frac{a'd''}{C^2}-\frac{c'd''}{C^2}-\frac{a'''}{C}-\frac{a''b'}{C^2}-\frac{a''d'}{C^2}+2\frac{a'a''}{C^2}+\frac{a''c'}{C^2}$$

$$-2\frac{a''b'}{C^2}-2\frac{a'b''}{C^2}-2\frac{a'b'd'}{C^3}+4\frac{a'^2b'}{C^3}+2\frac{a'b'c'}{C^3}-2\frac{b''c'}{C^2}-2\frac{b'c''}{C^2}$$

$$-2\frac{b'c'd'}{C^3}+2\frac{a'b'c'}{C^3}+4\frac{b'c'^2}{C^3}-2\frac{a''d'}{C^2}-2\frac{a'b'd'}{C^3}-2\frac{a'd''}{C^2}+4\frac{a'^2d'}{C^3}$$

$$+2\frac{a'c'd'}{C^3}-2\frac{b'c'd'}{C^3}-2\frac{c''d'}{C^2}-2\frac{c'd''}{C^2}+2\frac{a'c'd'}{C^3}+4\frac{c'^2d'}{C^3}$$

$$-\frac{b'c''}{C^2}-\frac{c'''}{C}-\frac{c''d'}{C^2}+\frac{a'c''}{C^2}+2\frac{c'c''}{C^2}+4\frac{a'a''}{C^2}+2\frac{a'^2b'}{C^3}+2\frac{a'^2d'}{C^3}$$

$$-6\frac{a'^3}{C^3}-2\frac{a'^2c'}{C^3}+2\frac{a''c'}{C^2}+2\frac{a'b'c'}{C^3}+2\frac{a'c''}{C^2}+2\frac{a'c'd'}{C^3}-4\frac{a'^2c'}{C^3}$$

$$-4\frac{a'c'^2}{C^3}+2\frac{b'c'^2}{C^3}+4\frac{c'c''}{C^2}+2\frac{c'^2d'}{C^3}-2\frac{a'c'^2}{C^3}-6\frac{c'^3}{C^3}$$

$$-\frac{a'''}{C}-\frac{a''c'}{C^2}+\frac{a''b'}{C^2}+\frac{a''d'}{C^2}-2\frac{a''c'}{C^2}-2\frac{a'c''}{C^2}+2\frac{a'b'c'}{C^3}+2\frac{a'c'd'}{C^3}$$

$$-\frac{a'c''}{C^2}-\frac{c'''}{C}+\frac{b'c''}{C^2}+\frac{c''d'}{C^2}+2\frac{a''b'}{C^2}+2\frac{a'b''}{C^2}+2\frac{a'b'c'}{C^3}-4\frac{a'b'^2}{C^3}-2\frac{a'b'd'}{C^3}$$

$$+2\frac{a''d'}{C^2}+2\frac{a'c'd'}{C^3}+2\frac{a'd''}{C^2}-2\frac{a'b'd'}{C^3}-4\frac{a'd'^2}{C^3}+2\frac{a'b'c'}{C^3}+2\frac{b''c'}{C^2}+2\frac{b'c''}{C^2}$$

$$-4\frac{b'^2c'}{C^3}-2\frac{b'c'd'}{C^3}+2\frac{a'c'd'}{C^3}+2\frac{c''d'}{C^2}+2\frac{c'd''}{C^2}-2\frac{b'c'd'}{C^3}-4\frac{c'd'^2}{C^3}$$

$$+\frac{a'b''}{C^2}+\frac{b'''}{C}+\frac{b''c'}{C^2}-2\frac{b'b''}{C^2}-\frac{b''d'}{C^2}-2\frac{a'b'^2}{C^3}-4\frac{b'b''}{C^2}-2\frac{b'^2c'}{C^3}$$

$$+6\frac{b'^3}{C^3}+2\frac{b'^2d'}{C^3}-2\frac{a'b'd'}{C^3}-2\frac{b''d'}{C^2}-2\frac{b'c'd'}{C^3}-2\frac{b'd''}{C^2}+4\frac{b'^2d'}{C^3}$$

$$+4\frac{b'd'^2}{C^3}+\frac{a'd''}{C^2}+\frac{c'd''}{C^2}+\frac{d'''}{C}-\frac{b'd''}{C^2}-2\frac{d'd''}{C^2}-2\frac{a'd'^2}{C^3}-2\frac{c'd'^2}{C^3}$$

$$\left.-4\frac{d'd''}{C^2}+2\frac{b'd'^2}{C^3}+6\frac{d'^3}{C^3}\right)$$

+0

Removed the same terms at both sides of the equal sign, merged the same kind term and taking note of that 1① i.e. $a'+b'=0$ and 2① i.e. $c'+d'=0$ the 5④ becomes

$-(a''''+b'''')+c''''+d''''+\varphi_3'''':(2C)$

$$= -6\varphi_3''\left( + c'' + d'' - 4\frac{a'b'}{C} + 2\frac{a'c'}{C} - 2\frac{a'd'}{C} - 2\frac{b'c'}{C} + 2\frac{b'd'}{C} + 2\frac{a'^2}{C} + 2\frac{b'^2}{C} \right)$$

$$-8\frac{a'a'''}{C} + 8\frac{a'b'''}{C} + 8\frac{a'''b'}{C} - 8\frac{b'b'''}{C} + 8\frac{c'c'''}{C} - 8\frac{c'd'''}{C} - 8\frac{c'''d'}{C} + 8\frac{d'd'''}{C}$$

$$-6\frac{a''^2}{C} - 6\frac{b''^2}{C} + 6\frac{c''^2}{C} + 6\frac{d''^2}{C} + 12\frac{a''b''}{C} - 12\frac{c''d''}{C}$$

$$-12\frac{a''b'^2}{C^2} - 12\frac{a'^2b''}{C^2} + 12\frac{a''d'^2}{C^2} - 12\frac{a'^2d''}{C^2} + 12\frac{b''c'^2}{C^2} - 12\frac{b'^2c''}{C^2} + 12\frac{c''d'^2}{C^2} + 12\frac{c'^2d''}{C^2}$$

$$+12\frac{a''b'c'}{C^2} + 12\frac{a'b''c'}{C^2} + 12\frac{a'b'c''}{C^2} + 12\frac{a''b'd'}{C^2} + 12\frac{a'b''d'}{C^2} + 12\frac{a'b'd''}{C^2}$$

$$-12\frac{a''c'd'}{C^2} - 12\frac{a'c''d'}{C^2} - 12\frac{a'c'd''}{C^2} - 12\frac{b''c'd'}{C^2} - 12\frac{b'c''d'}{C^2} - 12\frac{b'c'd''}{C^2}$$

$$-24\frac{a'a''b'}{C^2} - 24\frac{a'a''d'}{C^2} - 24\frac{a'b'b''}{C^2} + 24\frac{a'd'd''}{C^2} - 24\frac{b'b''c'}{C^2} + 24\frac{b'c'c''}{C^2} + 24\frac{c'c''d'}{C^2} + 24\frac{c'd'd''}{C^2}$$

$$+36\frac{a'^2a''}{C^2} + 36\frac{b'^2b''}{C^2} - 36\frac{c'^2c''}{C^2} - 36\frac{d'^2d''}{C^2} - 24\frac{a'b'^2c'}{C^3} - 24\frac{a'^2b'd'}{C^3} + 24\frac{a'c'd'^2}{C^3} + 24\frac{b'c'^2d'}{C^3}$$

$$+24\frac{a'b'^3}{C^3} + 24\frac{a'^3b'}{C^3} + 24\frac{a'^3d'}{C^3} - 24\frac{a'd'^3}{C^3} + 24\frac{b'^3c'}{C^3} - 24\frac{b'c'^3}{C^3} - 24\frac{c'd'^3}{C^3} - 24\frac{c'^3d'}{C^3}$$

$$\left. -24\frac{a'^4}{C^3} - 24\frac{b'^4}{C^3} + 24\frac{c'^4}{C^3} + 24\frac{d'^4}{C^3} \right)$$

$$+4\left( -2\frac{a'''}{C} + 2\frac{b'''}{C} - 2\frac{c'''}{C} + 2\frac{d'''}{C} + 6\frac{a'a''}{C^2} - 6\frac{b'b''}{C^2} + 6\frac{c'c''}{C^2} - 6\frac{d'd''}{C^2} \right.$$

$$+12\frac{a'b'c'}{C^3} - 12\frac{a'b'd'}{C^3} + 12\frac{a'c'd'}{C^3} - 12\frac{b'c'd'}{C^3}$$

$$+6\frac{a'^2b'}{C^3} - 6\frac{a'b'^2}{C^3} - 6\frac{a'^2c'}{C^3} - 6\frac{a'c'^2}{C^3} + 6\frac{a'^2d'}{C^3} - 6\frac{a'd'^2}{C^3} - 6\frac{b'^2c'}{C^3} + 6\frac{b'c'^2}{C^3}$$

$$\left. +6\frac{b'^2d'}{C^3} + 6\frac{b'd'^2}{C^3} + 6\frac{c'^2d'}{C^3} - 6\frac{c'd'^2}{C^3} - 6\frac{a'^3}{C^3} + 6\frac{b'^3}{C^3} - 6\frac{c'^3}{C^3} + 6\frac{d'^3}{C^3} \right)$$

The 5⑤ becomes

$$\varphi_3^{'''''\cdot}(2C) + 5\varphi_3^{''''\cdot}(a' + c' - b' + b' + d' - a')$$

$$+0$$

$$+10\varphi_3''\left( a''' + c''' + 3\frac{a''c'}{C} + 3\frac{a'c''}{C} - b''' - 3\frac{a''b'}{C} - 3\frac{a'b''}{C} - 3\frac{b''c'}{C} - 3\frac{b'c''}{C} \right.$$

$$-6\frac{a'b'c'}{C^2} + 6\frac{a'b'^2}{C^2} + 6\frac{b'^2c'}{C^2} + 6\frac{b'b''}{C} - 6\frac{b'^3}{C^2} + b''' + d''' + 3\frac{b''d'}{C} + 3\frac{b'd''}{C} - a''' - 3\frac{a''b'}{C}$$

$$\left. -3\frac{a'b''}{C} - 3\frac{a'd''}{C} - 3\frac{a''d'}{C} - 6\frac{a'b'd'}{C^2} + 6\frac{a'^2d'}{C^2} + 6\frac{a'^2b'}{C^2} + 6\frac{a'a''}{C} - 6\frac{a'^3}{C^2} \right)$$

$+0$

$$+\Bigg(+a''''' + 5\frac{a''''c'}{C} + 5\frac{a'c''''}{C} + c''''' + 10\frac{a'''c''}{C} + 10\frac{a''c'''}{C} - 20\frac{a'''b'c'}{C^2} - 20\frac{a'b'''c'}{C^2}$$

$$-20\frac{a'b'c'''}{C^2} - 5\frac{b'c''''}{C} - 5\frac{b''''c'}{C} - 5\frac{a'b''''}{C} - 5\frac{a''''b'}{C} - 30\frac{a'b''c''}{C^2} - 30\frac{a''b'c''}{C^2} - 30\frac{a''b''c'}{C^2}$$

$$-10\frac{b'''c''}{C} - 10\frac{b''c'''}{C} - 10\frac{a'''b''}{C} - 10\frac{a''b'''}{C} - b''''' + 10\frac{b'b''''}{C} + 20\frac{b'^2c'''}{C^2} + 20\frac{a'''b'^2}{C^2}$$

$$+30\frac{a'b''^2}{C^2} + 30\frac{b''^2c'}{C^2} + 60\frac{a'b'^2c''}{C^3} + 60\frac{a''b'^2c'}{C^3} + 120\frac{a'b'b''c'}{C^3} + 40\frac{b'b'''c'}{C^2} + 40\frac{a'b'b'''}{C^2}$$

$$+60\frac{a''b'b''}{C^2} + 60\frac{b'b''c''}{C^2} + 20\frac{b''b'''}{C} - 90\frac{b'b''^2}{C^2} - 60\frac{b'^2b'''}{C^2}$$

$$-60\frac{b'^3c''}{C^3} - 60\frac{a''b'^3}{C^3} - 24\cdot 5\frac{a'b'^3c'}{C^4} - 30\cdot 6\frac{b'^2b''c'}{C^3} - 30\cdot 6\frac{a'b'^2b''}{C^3}$$

$$+60\cdot 4\frac{b'^3b''}{C^3} + 24\cdot 5\frac{b'^4c'}{C^4} + 24\cdot 5\frac{a'b'^4}{C^4} - 24\cdot 5\frac{b'^5}{C^4}$$

$$+b''''' + 5\frac{b''''d'}{C} + 5\frac{b'd''''}{C} + d''''' + 10\frac{b''d'''}{C} + 10\frac{b'''d''}{C} - 20\frac{a'''b'd'}{C^2} - 20\frac{a'b'''d'}{C^2}$$

$$-20\frac{a'b'd'''}{C^2} - 5\frac{a'd''''}{C} - 5\frac{a'b''''}{C} - 5\frac{a''''d'}{C} - 5\frac{a''''b'}{C} - 30\frac{a'b''d''}{C^2} - 30\frac{a''b''d'}{C^2} - 30\frac{a''b'd''}{C^2}$$

$$-10\frac{a'''d''}{C} - 10\frac{a''d'''}{C} - 10\frac{a'''b''}{C} - 10\frac{a''b'''}{C} - a''''' + 10\frac{a'a''''}{C} + 20\frac{a'^2d'''}{C^2} + 20\frac{a'^2b'''}{C^2}$$

$$+30\frac{a''^2b'}{C^2} + 30\frac{a''^2d'}{C^2} + 60\frac{a'^2b''d'}{C^3} + 60\frac{a'^2b'd''}{C^3} + 120\frac{a'a''b'd'}{C^3} + 40\frac{a'a'''d'}{C^2} + 40\frac{a'a'''b'}{C^2}$$

$$+60\frac{a'a''b''}{C^2} + 60\frac{a'a''d''}{C^2} + 20\frac{a''a'''}{C} - 90\frac{a'a''^2}{C^2} - 60\frac{a'^2a'''}{C^2}$$

$$-60\frac{a'^3d''}{C^3} - 60\frac{a'^3b''}{C^3} - 24\cdot 5\frac{a'^3b'd'}{C^4} - 30\cdot 6\frac{a'^2a''b'}{C^3} - 30\cdot 6\frac{a'^2a''d'}{C^3}$$

$$+60\cdot 4\frac{a'^3a''}{C^3} + 24\cdot 5\frac{a'^4b'}{C^4} + 24\cdot 5\frac{a'^4d'}{C^4} - 24\cdot 5\frac{a'^5}{C^4}\Bigg)$$

$$
\begin{aligned}
&= \Big(a''''' + 5\frac{a''''c'}{C} + 5\frac{a'c''''}{C} + c''''' + 10\frac{a'''c''}{C} + 10\frac{a''c'''}{C} - 20\frac{a'''c'd'}{C^2} - 20\frac{a'c'''d'}{C^2} \\
&- 20\frac{a'c'd'''}{C^2} - 5\frac{a''''d'}{C} - 5\frac{c'd''''}{C} - 5\frac{c''''d'}{C} - 5\frac{a'd''''}{C} - 30\frac{a'c''d''}{C^2} - 30\frac{a''c'd''}{C^2} - 30\frac{a''c''d'}{C^2} \\
&- 10\frac{a'''d''}{C} - 10\frac{a''d'''}{C} - 10\frac{c'''d''}{C} - 10\frac{c''d'''}{C} - d''''' + 10\frac{d'd''''}{C} + 20\frac{a'''d'^2}{C^2} + 20\frac{c'''d'^2}{C^2} \\
&+ 30\frac{a'd''^2}{C^2} + 30\frac{c'd''^2}{C^2} + 60\frac{a''c'd'^2}{C^3} + 60\frac{a'c''d'^2}{C^3} + 120\frac{a'c'd'd''}{C^3} + 40\frac{a'd'd'''}{C^2} + 40\frac{c'd'd'''}{C^2} \\
&+ 60\frac{a''d'd''}{C^2} + 60\frac{c''d'd''}{C^2} + 20\frac{d''d'''}{C} - 90\frac{d'd''^2}{C^2} - 60\frac{d'^2d'''}{C^2} \\
&- 60\frac{c''d'^3}{C^3} - 60\frac{a''d'^3}{C^3} - 24\cdot 5\frac{a'c'd'^3}{C^4} - 30\cdot 6\frac{a'd'^2d''}{C^3} - 30\cdot 6\frac{c'd'^2d''}{C^3} \\
&+ 60\cdot 4\frac{d'^3d''}{C^3} + 24\cdot 5\frac{c'd'^4}{C^4} + 24\cdot 5\frac{a'd'^4}{C^4} - 24\cdot 5\frac{d'^5}{C^4}\Big) \\
&+ \Big(b''''' + 5\frac{b''''d'}{C} + 5\frac{b'd''''}{C} + d''''' + 10\frac{b'''d''}{C} + 10\frac{b''d'''}{C} - 20\frac{b'''c'd'}{C^2} - 20\frac{b'c'''d'}{C^2} \\
&- 20\frac{b'c'd'''}{C^2} - 5\frac{b'c''''}{C} - 5\frac{b''''c'}{C} - 5\frac{c'd''''}{C} - 5\frac{c''''d'}{C} - 30\frac{b''c'd''}{C^2} - 30\frac{b'c''d''}{C^2} - 30\frac{b''c''d'}{C^2} \\
&- 10\frac{b'''c''}{C} - 10\frac{b''c'''}{C} - 10\frac{c'''d''}{C} - 10\frac{c''d'''}{C} - c''''' + 10\frac{c'c''''}{C} + 20\frac{c'^2d'''}{C^2} + 20\frac{b'''c'^2}{C^2} \\
&+ 30\frac{b'c''^2}{C^2} + 30\frac{c''^2d'}{C^2} + 60\frac{b'c'^2d''}{C^3} + 60\frac{b''c'^2d'}{C^3} + 120\frac{b'c'c''d'}{C^3} + 40\frac{b'c'c'''}{C^2} + 40\frac{c'c'''d'}{C^2} \\
&+ 60\frac{c'c''d''}{C^2} + 60\frac{b''c'c''}{C^2} + 20\frac{c''c'''}{C} - 90\frac{c'c''^2}{C^2} - 60\frac{c'^2c'''}{C^2} \\
&- 60\frac{b''c'^3}{C^3} - 60\frac{c'^3d''}{C^3} - 24\cdot 5\frac{b'c'^3d'}{C^4} - 30\cdot 6\frac{b'c'^2c''}{C^3} - 30\cdot 6\frac{c'^2c''d'}{C^3} \\
&+ 60\cdot 4\frac{c'^3c''}{C^3} + 24\cdot 5\frac{b'c'^4}{C^4} + 24\cdot 5\frac{c'^4d'}{C^4} - 24\cdot 5\frac{c'^5}{C^4}\Big)
\end{aligned}
$$

$$+5\Big(+\frac{b''''}{C}+\frac{d''''}{C}+4\frac{b'''d'}{C^2}+4\frac{b'd'''}{C^2}+6\frac{b''d''}{C^2}-4\frac{a'''d'}{C^2}-4\frac{a'''b'}{C^2}-4\frac{a'b'''}{C^2}-4\frac{a'd'''}{C^2}$$

$$-\frac{a''''}{C}-4\frac{b'''c'}{C^2}-4\frac{c'd'''}{C^2}-4\frac{b'c'''}{C^2}-4\frac{c'''d'}{C^2}-\frac{c''''}{C}-12\frac{a''b'd'}{C^3}-12\frac{a'b''d'}{C^3}$$

$$-12\frac{a'b'd''}{C^3}-12\frac{b''c'd'}{C^3}-12\frac{b'c''d'}{C^3}-12\frac{b'c'd''}{C^3}-6\frac{a''b''}{C^2}-6\frac{a''d''}{C^2}-6\frac{b''c''}{C^2}-6\frac{c''d''}{C^2}$$

$$+6\frac{a''^2}{C^2}+6\frac{c''^2}{C^2}+12\frac{a'^2b''}{C^3}+12\frac{a'^2d''}{C^3}+12\frac{b''c'^2}{C^3}+12\frac{c'^2d''}{C^3}$$

$$+24\frac{a'^2b'd'}{C^4}+24\frac{b'c'^2d'}{C^4}+24\frac{a'b'c'd'}{C^4}+12\frac{a''b'c'}{C^3}+12\frac{a''c'd'}{C^3}+12\frac{a'c'd''}{C^3}+12\frac{a'c''d'}{C^3}$$

$$+12\frac{a'b''c'}{C^3}+12\frac{a'b'c''}{C^3}+6\frac{a''c''}{C^2}+24\frac{a'a''b'}{C^3}+24\frac{a'a''d'}{C^3}+24\frac{b'c'c''}{C^3}+24\frac{c'c''d'}{C^3}$$

$$+8\frac{a'a'''}{C^2}+8\frac{c'c'''}{C^2}+4\frac{a'''c'}{C^2}+4\frac{a'c'''}{C^2}-24\frac{a'b'c'^2}{C^4}-24\frac{a'c'^2d'}{C^4}-24\frac{a'^2c'd'}{C^4}$$

$$-24\frac{a'^2b'c'}{C^4}-12\frac{a'^2c''}{C^3}-12\frac{a''c'^2}{C^3}-24\frac{a'^3b'}{C^4}-24\frac{a'^3d'}{C^4}-24\frac{b'c'^3}{C^4}-24\frac{c'^3d'}{C^4}$$

$$-36\frac{a'^2a''}{C^3}-36\frac{c'^2c''}{C^3}-24\frac{a'c'c''}{C^3}-24\frac{a'a''c'}{C^3}+24\frac{a'c'^3}{C^4}+24\frac{a'^3c'}{C^4}$$

$$+24\frac{a'^2c'^2}{C^4}+24\frac{a'^4}{C^4}+24\frac{c'^4}{C^4}$$

$$-\frac{a''''}{C}-\frac{c''''}{C}-4\frac{a'''c'}{C^2}-4\frac{a'c'''}{C^2}-6\frac{a''c''}{C^2}+4\frac{a'''b'}{C^2}+4\frac{a'''d'}{C^2}+4\frac{b'c'''}{C^2}+4\frac{c'''d'}{C^2}$$

$$+\frac{d''''}{C}+4\frac{a'd'''}{C^2}+4\frac{c'd'''}{C^2}+4\frac{a'b'''}{C^2}+4\frac{b'''c'}{C^2}+\frac{b''''}{C}+12\frac{a''b'c'}{C^3}+12\frac{a'b''c'}{C^3}$$

$$+12\frac{a'b'c''}{C^3}+12\frac{a''c'd'}{C^3}+12\frac{a'c''d'}{C^3}+12\frac{a'c'd''}{C^3}+6\frac{a''b''}{C^2}+6\frac{b''c''}{C^2}+6\frac{a''d''}{C^2}+6\frac{c''d''}{C^2}$$

$$-6\frac{b''^2}{C^2}-6\frac{d''^2}{C^2}-12\frac{a''d'^2}{C^3}-12\frac{c''d'^2}{C^3}-12\frac{b'^2c''}{C^3}-12\frac{a''b'^2}{C^3}$$

$$-24\frac{a'c'd'^2}{C^4}-24\frac{a'b'^2c'}{C^4}-24\frac{a'b'c'd'}{C^4}-12\frac{b'c''d'}{C^3}-12\frac{b'c'd''}{C^3}-12\frac{a''b'd'}{C^3}-12\frac{a'b'd''}{C^3}$$

$$-12\frac{b''c'd'}{C^3}-12\frac{a'b''d'}{C^3}-6\frac{b''d''}{C^2}-24\frac{b'b''c'}{C^3}-24\frac{a'b'b''}{C^3}-24\frac{c'd'd''}{C^3}-24\frac{a'd'd''}{C^3}$$

$$-8\frac{b'b'''}{C^2}-8\frac{d'd'''}{C^2}-4\frac{b'''d'}{C^2}-4\frac{b'd'''}{C^2}+24\frac{a'b'd'^2}{C^4}+24\frac{b'c'd'^2}{C^4}+24\frac{b'^2c'd'}{C^4}$$

$$+24\frac{a'b'^2d'}{C^4}+12\frac{b'^2d''}{C^3}+12\frac{b''d'^2}{C^3}+24\frac{a'b'^3}{C^4}+24\frac{b'^3c'}{C^4}+24\frac{a'd'^3}{C^4}+24\frac{c'd'^3}{C^4}$$

$$+36\frac{d'^2d''}{C^3}+36\frac{b'^2b''}{C^3}+24\frac{b'b''d'}{C^3}+24\frac{b'd'd''}{C^3}-24\frac{b'^3d'}{C^4}-24\frac{b'd'^3}{C^4}$$

$$-24\frac{b'^2d'^2}{C^4}-24\frac{d'^4}{C^4}-24\frac{b'^4}{C^4}\Big)$$

$+0$

Removed the same terms at both sides of the equal sign, merged the same kind term and taking note of that 1① i.e. $a'+b'=0$ and 2① i.e. $c'+d'=0$ the 5⑤ becomes

$$-a'''''-b'''''+c'''''+d'''''+\varphi_3'''''(2C)=$$

$$-5\varphi_3''''(+c'+d')-10\varphi_3''\left(+c'''+d'''+3\frac{a''c'}{C}+3\frac{a'c''}{C}-3\frac{a'd''}{C}-3\frac{a''d'}{C}-3\frac{b''c'}{C}-3\frac{b'c''}{C}\right.$$

$$\left.+3\frac{b''d'}{C}+3\frac{b'd''}{C}+6\frac{a'a''}{C}+6\frac{b'b''}{C}-6\frac{a''b'}{C}-6\frac{a'b''}{C}+6\frac{a'^2d'}{C^2}+6\frac{b'^2c'}{C^2}\right)$$

$$-10\frac{a'a''''}{C}-10\frac{b'b''''}{C}+10\frac{c'c''''}{C}+10\frac{d'd''''}{C}+10\frac{a''''b'}{C}+10\frac{a'b''''}{C}-10\frac{c'd''''}{C}-10\frac{c''''d'}{C}$$

$$-20\frac{a''a'''}{C}+20\frac{a'''b''}{C}+20\frac{a''b'''}{C}-20\frac{b''b'''}{C}+20\frac{c''c'''}{C}-20\frac{c''d'''}{C}-20\frac{c'''d''}{C}+20\frac{d''d'''}{C}$$

$$-20\frac{a'^2b'''}{C^2}-20\frac{a'''b'^2}{C^2}+20\frac{a'''d'^2}{C^2}-20\frac{a'^2d'''}{C^2}-20\frac{b'^2c'''}{C^2}+20\frac{b'''c'^2}{C^2}+20\frac{c'''d'^2}{C^2}+20\frac{c'^2d'''}{C^2}$$

$$+60\frac{a'^2a'''}{C^2}+60\frac{b'^2b'''}{C^2}-60\frac{c'^2c'''}{C^2}-60\frac{d'^2d'''}{C^2}$$

$$-40\frac{a'a'''b'}{C^2}-40\frac{a'a'''d'}{C^2}-40\frac{a'b'b'''}{C^2}+40\frac{a'd'd'''}{C^2}-40\frac{b'b'''c'}{C^2}+40\frac{b'c'c'''}{C^2}+40\frac{c'c'''d'}{C^2}+40\frac{c'd'd'''}{C^2}$$

$$+20\frac{a'''b'c'}{C^2}+20\frac{a'b'''c'}{C^2}+20\frac{a'b'c'''}{C^2}+20\frac{a'''b'd'}{C^2}+20\frac{a'b'''d'}{C^2}+20\frac{a'b'd'''}{C^2}$$

$$-20\frac{a'''c'd'}{C^2}-20\frac{a'c'''d'}{C^2}-20\frac{a'c'd'''}{C^2}-20\frac{b'''c'd'}{C^2}-20\frac{b'c'''d'}{C^2}-20\frac{b'c'd'''}{C^2}$$

$$+90\frac{a'a''^2}{C^2}+90\frac{b'b''^2}{C^2}-90\frac{c'c''^2}{C^2}-90\frac{d'd''^2}{C^2}-60\frac{a'a''b''}{C^2}-60\frac{a'a''d''}{C^2}-60\frac{a''b'b''}{C^2}$$

$$+60\frac{a''d'd''}{C^2}-60\frac{b'b''c''}{C^2}+60\frac{b''c'c''}{C^2}+60\frac{c'c''d''}{C^2}+60\frac{c''d'd''}{C^2}$$

$$-30\frac{a''^2b'}{C^2}-30\frac{a'b''^2}{C^2}-30\frac{a''^2d'}{C^2}+30\frac{a'd''^2}{C^2}-30\frac{b''^2c'}{C^2}+30\frac{b'c''^2}{C^2}+30\frac{c''^2d'}{C^2}+30\frac{c'd''^2}{C^2}$$

$$+30\frac{a'b''c''}{C^2}+30\frac{a''b'c''}{C^2}+30\frac{a''b''c'}{C^2}+30\frac{a''b'd''}{C^2}+30\frac{a''b''d'}{C^2}+30\frac{a'b''d''}{C^2}$$

$$-30\frac{a''c'd''}{C^2}-30\frac{a'c''d''}{C^2}-30\frac{a''c''d'}{C^2}-30\frac{b''c''d'}{C^2}-30\frac{b''c'd''}{C^2}-30\frac{b'c''d''}{C^2}$$

$$-60\frac{a'b'^{2}c''}{C^{3}}-60\frac{a''b'^{2}c'}{C^{3}}-60\frac{a'^{2}b''d'}{C^{3}}-60\frac{a'^{2}b'd''}{C^{3}}+60\frac{a''c'd'^{2}}{C^{3}}+60\frac{a'c''d'^{2}}{C^{3}}+60\frac{b''c'^{2}d'}{C^{3}}$$

$$+60\frac{b'c'^{2}d''}{C^{3}}+60\frac{a''b'^{3}}{C^{3}}+60\frac{a'^{3}b''}{C^{3}}+60\frac{a'^{3}d''}{C^{3}}-60\frac{a''d'^{3}}{C^{3}}+60\frac{b'^{3}c''}{C^{3}}-60\frac{b''c'^{3}}{C^{3}}-60\frac{c''d'^{3}}{C^{3}}$$

$$-60\frac{c'^{3}d''}{C^{3}}-2\cdot 60\frac{a'a''b'd'}{C^{3}}-2\cdot 60\frac{a'b'b''c'}{C^{3}}+2\cdot 60\frac{a'c'd'd''}{C^{3}}+2\cdot 60\frac{b'c'c''d'}{C^{3}}+3\cdot 60\frac{a'^{2}a''b'}{C^{3}}$$

$$+3\cdot 60\frac{a'^{2}a''d'}{C^{3}}+3\cdot 60\frac{a'b'^{2}b''}{C^{3}}-3\cdot 60\frac{a'd'^{2}d''}{C^{3}}+3\cdot 60\frac{b'^{2}b''c'}{C^{3}}-3\cdot 60\frac{b'c'^{2}c''}{C^{3}}-3\cdot 60\frac{c'^{2}c''d'}{C^{3}}$$

$$-3\cdot 60\frac{c'd'^{2}d''}{C^{3}}-4\cdot 60\frac{a'^{3}a''}{C^{3}}-40\cdot 6\frac{b'^{3}b''}{C^{3}}+60\cdot 4\frac{c'^{3}c''}{C^{3}}+60\cdot 4\frac{d'^{3}d''}{C^{3}}$$

$$-2\cdot 60\frac{a'^{4}b'}{C^{4}}-2\cdot 60\frac{a'b'^{4}}{C^{4}}-2\cdot 60\frac{a'^{4}d'}{C^{4}}+2\cdot 60\frac{a'd'^{4}}{C^{4}}-2\cdot 60\frac{b'^{4}c'}{C^{4}}+2\cdot 60\frac{b'c'^{4}}{C^{4}}$$

$$+2\cdot 60\frac{c'd'^{4}}{C^{4}}+2\cdot 60\frac{c'^{4}d'}{C^{4}}+2\cdot 60\frac{a'b'^{3}c'}{C^{4}}+2\cdot 60\frac{a'^{3}b'd'}{C^{4}}-2\cdot 60\frac{a'c'd'^{3}}{C^{4}}-2\cdot 60\frac{b'c'^{3}d'}{C^{4}}$$

$$+2\cdot 60\frac{a'^{5}}{C^{4}}+2\cdot 60\frac{b'^{5}}{C^{4}}-2\cdot 60\frac{c'^{5}}{c^{4}}-2\cdot 60\frac{d'^{5}}{d^{4}}$$

$$+5\Bigg(-2\frac{a''''}{C}+2\frac{b''''}{C}-2\frac{c''''}{C}+2\frac{d''''}{C}+8\frac{a'a'''}{C^{2}}-8\frac{b'b'''}{C^{2}}+8\frac{c'c'''}{C^{2}}-8\frac{d'd'''}{C^{2}}+6\frac{a''^{2}}{C^{2}}-6\frac{b''^{2}}{C^{2}}$$

$$+6\frac{c''^{2}}{C^{2}}-6\frac{d''^{2}}{C^{2}}-36\frac{a'^{2}a''}{C^{3}}+36\frac{b'^{2}b''}{C^{3}}-36\frac{c'^{2}c''}{C^{3}}+36\frac{d'^{2}d''}{C^{3}}-12\frac{a''b'^{2}}{C^{3}}+12\frac{a'^{2}b''}{C^{3}}$$

$$-12\frac{a'^{2}c''}{C^{3}}-12\frac{a''c'^{2}}{C^{3}}-12\frac{a''d'^{2}}{C^{3}}+12\frac{a'^{2}d''}{C^{3}}+12\frac{b''c'^{2}}{C^{3}}-12\frac{b'^{2}c''}{C^{3}}+12\frac{b''d'^{2}}{C^{3}}+12\frac{b'^{2}d''}{C^{3}}$$

$$+12\frac{c'^{2}d''}{C^{3}}-12\frac{c''d'^{2}}{C^{3}}+24\frac{a'a''b'}{C^{3}}-24\frac{a'a''c'}{C^{3}}+24\frac{a'a''d'}{C^{3}}-24\frac{a'b'b''}{C^{3}}-24\frac{a'c'c''}{C^{3}}$$

$$-24\frac{a'd'd''}{C^{3}}-24\frac{b'b''c'}{C^{3}}+24\frac{b'b''d'}{C^{3}}+24\frac{b'c'c''}{C^{3}}+24\frac{b'd'd''}{C^{3}}+24\frac{c'c''d'}{C^{3}}-24\frac{c'd'd''}{C^{3}}$$

$$+24\frac{a''b'c'}{C^{3}}+24\frac{a'b''c'}{C^{3}}+24\frac{a'b'c''}{C^{3}}-24\frac{a''b'd'}{C^{3}}-24\frac{a'b''d'}{C^{3}}-24\frac{a'b'd''}{C^{3}}+24\frac{a''c'd'}{C^{3}}$$

$$+24\frac{a'c''d'}{C^{3}}+24\frac{a'c'd''}{C^{3}}-24\frac{b''c'd'}{C^{3}}-24\frac{b'c''d'}{C^{3}}-24\frac{b'c'd''}{C^{3}}-24\frac{a'^{2}b'c'}{C^{4}}-24\frac{a'b'^{2}c'}{C^{4}}$$

$$-24\frac{a'b'c'^{2}}{C^{4}}+24\frac{a'^{2}b'd'}{C^{4}}+24\frac{a'b'^{2}d'}{C^{4}}+24\frac{a'b'd'^{2}}{C^{4}}-24\frac{a'^{2}c'd'}{C^{4}}-24\frac{a'c'^{2}d'}{C^{4}}-24\frac{a'c'd'^{2}}{C^{4}}$$

$$+24\frac{b'^{2}c'd'}{C^{4}}+24\frac{b'c'^{2}d'}{C^{4}}+24\frac{b'c'd'^{2}}{C^{4}}+24\frac{a'b'^{3}}{C^{4}}-24\frac{a'^{3}b'}{C^{4}}+24\frac{a'c'^{3}}{C^{4}}+24\frac{a'^{3}c'}{C^{4}}+24\frac{a'd'^{3}}{C^{4}}$$

$$-24\frac{a'^{3}d'}{C^{4}}-24\frac{b'c'^{3}}{C^{4}}+24\frac{b'^{3}c'}{C^{4}}-24\frac{b'^{3}d'}{C^{4}}-24\frac{b'd'^{3}}{C^{4}}-24\frac{c'^{3}d'}{C^{4}}+24\frac{c'd'^{3}}{C^{4}}+24\frac{a'^{2}c'^{2}}{C^{4}}$$

$$-24\frac{b'^{2}d'^{2}}{C^{4}}+24\frac{a'^{4}}{C^{4}}-24\frac{b'^{4}}{C^{4}}+24\frac{c'^{4}}{C^{4}}-24\frac{d'^{4}}{C^{4}}\Bigg)$$

The 5⑥ becomes

$$\varphi_3''''''\cdot\left(C+C\right)+0$$

$$+15\varphi_3''''\cdot\left(\ a''+2\frac{a'c'}{C}+c''-b''-2\frac{b'c'}{C}-2\frac{a'b'}{C}+2\frac{b'^2}{C}\right.$$

$$\left.+b''+2\frac{b'd'}{C}+d''-a''-2\frac{a'b'}{C}-2\frac{a'd'}{C}+2\frac{a'^2}{C}\ \right)$$

+0

$$+15\varphi_3''\left(a''''+c''''+4\frac{a'''c'}{C}+4\frac{a'c'''}{C}+6\frac{a''c''}{C}-12\frac{a''b'c'}{C^2}-12\frac{a'b''c'}{C^2}-12\frac{a'b'c''}{C^2}\right.$$

$$-4\frac{a'b'''}{C}-4\frac{b'''c'}{C}-4\frac{b'c'''}{C}-4\frac{a'''b'}{C}-b''''-6\frac{a''b''}{C}-6\frac{b''c''}{C}+6\frac{b''^2}{C}$$

$$+12\frac{a''b'^2}{C^2}+12\frac{b'^2c''}{C^2}+24\frac{a'b'^2c'}{C^3}-24\frac{a'b'^3}{C^3}-24\frac{b'^3c'}{C^3}+24\frac{b'b''c'}{C^2}+24\frac{a'b'b''}{C^2}$$

$$+8\frac{b'b'''}{C}-36\frac{b'^2b''}{C^2}+24\frac{b'^4}{C^3}$$

$$+b''''+d''''+4\frac{b'''d'}{C}+4\frac{b'd'''}{C}+6\frac{b''d''}{C}-12\frac{a''b'd'}{C^2}-12\frac{a'b''d'}{C^2}-12\frac{a'b'd''}{C^2}$$

$$-4\frac{a'''d'}{C}-4\frac{a'd'''}{C}-4\frac{a'''b'}{C}-4\frac{a'b'''}{C}-a''''-6\frac{a''b''}{C}-6\frac{a''d''}{C}+6\frac{a''^2}{C}$$

$$+12\frac{a'^2d''}{C^2}+12\frac{a'^2b''}{C^2}+24\frac{a'^2b'd'}{C^3}-24\frac{a'^3b'}{C^3}-24\frac{a'^3d'}{C^3}+24\frac{a'a''b'}{C^2}+24\frac{a'a''d'}{C^2}$$

$$\left.+8\frac{a'a'''}{C}-36\frac{a'^2a''}{C^2}+24\frac{a'^4}{C^3}\right)$$

+0

$$+\left(+a''''''-b''''''+c''''''+6\frac{a'c'''''}{C}-6\frac{a'''''b'}{C}+6\frac{a'''''c'}{C}-6\frac{b'c'''''}{C}-6\frac{a'b'''''}{C}-6\frac{b'''''c'}{C}\right.$$

$$+12\frac{b'b'''''}{C}+15\frac{a''''c''}{C}+15\frac{a''c''''}{C}-15\frac{a''b''''}{C}-15\frac{a''''b''}{C}-15\frac{b''''c''}{C}-15\frac{b''c''''}{C}+30\frac{b''b''''}{C}$$

$$-30\frac{a''''b'c'}{C^2}-30\frac{a'b''''c'}{C^2}-30\frac{a'b'c''''}{C^2}+30\frac{b'^2c''''}{C^2}+30\frac{a''''b'^2}{C^2}+60\frac{b'b''''c'}{C^2}+60\frac{a'b'b''''}{C^2}$$

$$-90\frac{b'^2b''''}{C^2}+20\frac{a'''c'''}{C}-20\frac{b'''c'''}{C}-20\frac{a'''b'''}{C}+20\frac{b'''^2}{C}$$

$$-60\frac{a'''b'c''}{C^2}-60\frac{a''b'c'''}{C^2}-60\frac{a'b''c'''}{C^2}-60\frac{a'''b''c'}{C^2}-60\frac{a''b'''c'}{C^2}-60\frac{a'b'''c''}{C^2}$$

$$+120\frac{b'b'''c''}{C^2}+120\frac{b'b''c'''}{C^2}+120\frac{a'''b'b''}{C^2}+120\frac{a'b''b'''}{C^2}+120\frac{b''b'''c'}{C^2}+120\frac{a''b'b'''}{C^2}$$

$$-360\frac{b'b''b'''}{C^2}+240\frac{a'b'b'''c'}{C^3}+120\frac{a'''{b'}^2c'}{C^3}+120\frac{a'{b'}^2c'''}{C^3}-120\frac{a'''{b'}^3}{C^3}-120\frac{{b'}^3c'''}{C^3}+480\frac{{b'}^3b'''}{C^3}$$

$$-360\frac{{b'}^2b'''c'}{C^3}-360\frac{a'{b'}^2b'''}{C^3}-90\frac{a''b''c''}{C^2}+90\frac{a''{b''}^2}{C^2}+90\frac{{b''}^2c''}{C^2}-90\frac{{b''}^3}{C^2}$$

$$+180\frac{a'{b''}^2c'}{C^3}+180\frac{a''{b'}^2c''}{C^3}-540\frac{{b'}^2b''c''}{C^3}-540\frac{a''{b'}^2b''}{C^3}-540\frac{a'b'{b''}^2}{C^3}-540\frac{b'{b''}^2c'}{C^3}$$

$$+360\frac{a'b'b''c''}{C^3}+360\frac{a''b'b''c'}{C^3}+1080\frac{{b'}^2{b''}^2}{C^3}-360\frac{a''{b'}^3c'}{C^4}-360\frac{a'{b'}^3c''}{C^4}+360\frac{{b'}^4c''}{C^4}+360\frac{a''{b'}^4}{C^4}$$

$$-1080\frac{a'{b'}^2b''c'}{C^4}+1440\frac{{b'}^3b''c'}{C^4}+1440\frac{a'{b'}^3b''}{C^4}-1800\frac{{b'}^4b''}{C^4}$$

$$+720\frac{a'{b'}^4c'}{C^5}-720\frac{{b'}^5c'}{C^5}-720\frac{a'{b'}^5}{C^5}+720\frac{{b'}^6}{C^5}$$

$$-a''''''+b''''''+d''''''+6\frac{b'd'''''}{C}+6\frac{b'''''d'}{C}-6\frac{a'''''d'}{C}-6\frac{a'd'''''}{C}-6\frac{a'''''b'}{C}-6\frac{a'b'''''}{C}$$

$$+12\frac{a'a'''''}{C}+15\frac{b''''d''}{C}+15\frac{b''d''''}{C}-15\frac{a''''d''}{C}-15\frac{a''b''''}{C}-15\frac{a''d''''}{C}-15\frac{a''''b''}{C}+30\frac{a''a''''}{C}$$

$$-30\frac{a''''b'd'}{C^2}-30\frac{a'b''''d'}{C^2}-30\frac{a'b'd''''}{C^2}+30\frac{{a'}^2d''''}{C^2}+30\frac{{a'}^2b''''}{C^2}+60\frac{a'a''''b'}{C^2}+60\frac{a'a''''d'}{C^2}$$

$$-90\frac{{a'}^2a''''}{C^2}+20\frac{b'''d'''}{C}-20\frac{a'''b'''}{C}-20\frac{a'''d'''}{C}+20\frac{{a'''}^2}{C}$$

$$-60\frac{a'b''d'''}{C^2}-60\frac{a'b'''d''}{C^2}-60\frac{a'''b''d'}{C^2}-60\frac{a'''b'd''}{C^2}-60\frac{a''b'''d'}{C^2}-60\frac{a''b'd'''}{C^2}$$

$$+120\frac{a'a'''d''}{C^2}+120\frac{a'a'''b''}{C^2}+120\frac{a'a''d'''}{C^2}+120\frac{a'a''b'''}{C^2}+120\frac{a''a'''b'}{C^2}+120\frac{a''a'''d'}{C^2}$$

$$-360\frac{a'a''a'''}{C^2}+240\frac{a'a'''b'd'}{C^3}+120\frac{{a'}^2b'd'''}{C^3}+120\frac{{a'}^2b'''d'}{C^3}-120\frac{{a'}^3d'''}{C^3}-120\frac{{a'}^3b'''}{C^3}+480\frac{{a'}^3a'''}{C^3}$$

$$-360\frac{{a'}^2a'''b'}{C^3}-360\frac{{a'}^2a'''d'}{C^3}-90\frac{a''b''d''}{C^2}+90\frac{{a''}^2d''}{C^2}+90\frac{{a''}^2b''}{C^2}-90\frac{{a''}^3}{C^2}$$

$$+180\frac{{a'}^2b''d''}{C^3}+180\frac{{a''}^2b'd'}{C^3}-540\frac{{a'}^2a''b''}{C^3}-540\frac{{a'}^2a''d''}{C^3}-540\frac{a'{a''}^2b'}{C^3}-540\frac{a'{a''}^2d'}{C^3}$$

$$+360\frac{a'a''b'd''}{C^3}+360\frac{a'a''b''d'}{C^3}+1080\frac{{a'}^2{a''}^2}{C^3}-360\frac{{a'}^3b''d'}{C^4}-360\frac{{a'}^3b'd''}{C^4}+360\frac{{a'}^4d''}{C^4}+360\frac{{a'}^4b''}{C^4}$$

$$==$$

$$-1080\frac{{a'}^2a''b'd'}{C^4}+1440\frac{{a'}^3a''b'}{C^4}+1440\frac{{a'}^3a''d'}{C^4}-1800\frac{{a'}^4a''}{C^4}$$

$$+720\frac{{a'}^4b'd'}{C^5}-720\frac{{a'}^5b'}{C^5}-720\frac{{a'}^5d'}{C^5}+720\frac{{a'}^6}{C^5}\Bigg)$$

$$
\begin{aligned}
&\Big(a'''''' + c'''''' - d'''''' + 6\frac{a'''''c'}{C} + 6\frac{a'c'''''}{C} - 6\frac{c'd'''''}{C} - 6\frac{a'''''d'}{C} - 6\frac{c'''''d'}{C} - 6\frac{a'd'''''}{C} \\
&+12\frac{d'd'''''}{C} + 15\frac{a''''c''}{C} + 15\frac{a''c''''}{C} - 15\frac{c''''d''}{C} - 15\frac{a''''d''}{C} - 15\frac{c''d''''}{C} - 15\frac{a''d''''}{C} + 30\frac{d''d''''}{C} \\
&-30\frac{a''''c'd'}{C^2} - 30\frac{a'c''''d'}{C^2} - 30\frac{a'c'd''''}{C^2} + 30\frac{a''''d'^2}{C^2} + 30\frac{c''''d'^2}{C^2} + 60\frac{c'd'd''''}{C^2} + 60\frac{a'd'd''''}{C^2} \\
&-90\frac{d'^2d''''}{C^2} + 20\frac{a'''c'''}{C} - 20\frac{a'''d'''}{C} - 20\frac{c'''d'''}{C} + 20\frac{d'''^2}{C} \\
&-60\frac{a'c''d'''}{C^2} - 60\frac{a'c'''d''}{C^2} - 60\frac{a''c'd'''}{C^2} - 60\frac{a''c'''d'}{C^2} - 60\frac{a'''c''d'}{C^2} - 60\frac{a'''c'd''}{C^2} \\
&+120\frac{a'''d'd''}{C^2} + 120\frac{a''d'd'''}{C^2} + 120\frac{c'''d'd''}{C^2} + 120\frac{c''d'd'''}{C^2} + 120\frac{c'd''d'''}{C^2} + 120\frac{a'd''d'''}{C^2} \\
&-360\frac{d'd''d'''}{C^2} + 240\frac{a'c'd'd'''}{C^3} + 120\frac{a'''c'd'^2}{C^3} + 120\frac{a'c'''d'^2}{C^3} - 120\frac{a'''d'^3}{C^3} - 120\frac{c'''d'^3}{C^3} + 480\frac{d'^3d'''}{C^3} \\
&-360\frac{a'd'^2d'''}{C^3} - 360\frac{c'd'^2d'''}{C^3} - 90\frac{a''c''d''}{C^2} + 90\frac{a''d''^2}{C^2} + 90\frac{c''d''^2}{C^2} - 90\frac{d''^3}{C^2} \\
&+180\frac{a''c''d'^2}{C^3} + 180\frac{a'c'd''^2}{C^3} - 540\frac{c'd'd''^2}{C^3} - 540\frac{a'd'd''^2}{C^3} - 540\frac{a''d'^2d''}{C^3} - 540\frac{c''d'^2d''}{C^3} \\
&+360\frac{a'c''d'd''}{C^3} + 360\frac{a''c'd'd''}{C^3} + 1080\frac{d'^2d''^2}{C^3} - 360\frac{a''c'd'^3}{C^4} - 360\frac{a'c''d'^3}{C^4} + 360\frac{c''d'^4}{C^4} + 360\frac{a''d'^4}{C^4} \\
&-1080\frac{a'c'd'^2d''}{C^4} + 60\cdot 24\frac{c'd'^3d''}{C^4} + 60\cdot 24\frac{a'd'^3d''}{C^4} - 60\cdot 30\frac{d'^4d''}{C^4} \\
&+24\cdot 30\frac{a'c'd'^4}{C^5} - 24\cdot 30\frac{c'd'^5}{C^5} - 24\cdot 30\frac{a'd'^5}{C^5} + 24\cdot 30\frac{d'^6}{C^5}\Big)
\end{aligned}
$$

$$
\begin{aligned}
&+\Big(b'''''' - c'''''' + d'''''' + 6\frac{b'''''d'}{C} + 6\frac{b'd'''''}{C} - 6\frac{c'd'''''}{C} - 6\frac{c'''''d'}{C} - 6\frac{b'''''c'}{C} - 6\frac{b'c'''''}{C} \\
&+12\frac{c'c'''''}{C} + 15\frac{b''''d''}{C} + 15\frac{b''d''''}{C} - 15\frac{b''c''''}{C} - 15\frac{c''d''''}{C} - 15\frac{c''''d''}{C} - 15\frac{b''''c''}{C} + 30\frac{c''c''''}{C} \\
&-30\frac{b''''c'd'}{C^2} - 30\frac{b'c''''d'}{C^2} - 30\frac{b'c'd''''}{C^2} + 30\frac{b''''c'^2}{C^2} + 30\frac{c'^2d''''}{C^2} + 60\frac{c'c''''d'}{C^2} + 60\frac{b'c'c''''}{C^2} \\
&-90\frac{c'^2c''''}{C^2} + 20\frac{b'''d'''}{C} - 20\frac{c'''d'''}{C} - 20\frac{b'''c'''}{C} + 20\frac{c'''^2}{C} \\
&-60\frac{b''c'd'''}{C^2} - 60\frac{b'''c''d'}{C^2} - 60\frac{b'''c'd''}{C^2} - 60\frac{b''c'''d'}{C^2} - 60\frac{b'c'''d''}{C^2} - 60\frac{b'c''d'''}{C^2} \\
&+120\frac{b'''c'c''}{C^2} + 120\frac{b''c'c'''}{C^2} + 120\frac{c'c'''d''}{C^2} + 120\frac{c'c''d'''}{C^2} + 120\frac{c''c'''d'}{C^2} + 120\frac{b'c''c'''}{C^2} \\
&-360\frac{c'c''c'''}{C^2} + 240\frac{b'c'c'''d'}{C^3} + 120\frac{b'c'^2d'''}{C^3} + 120\frac{b'''c'^2d'}{C^3} - 120\frac{c'^3d'''}{C^3} - 120\frac{b'''c'^3}{C^3} + 480\frac{c'^3c'''}{C^3} \\
&-360\frac{b'c'^2c'''}{C^3} - 360\frac{c'^2c'''d'}{C^3} - 90\frac{b''c''d''}{C^2} + 90\frac{c''^2d''}{C^2} + 90\frac{b''c''^2}{C^2} - 90\frac{c''^3}{C^2} \\
&+180\frac{b''c'^2d''}{C^3} + 180\frac{b'c''^2d'}{C^3} - 540\frac{b'c'c''^2}{C^3} - 540\frac{c'c''^2d'}{C^3} - 540\frac{c'^2c''d''}{C^3} - 540\frac{b''c'^2c''}{C^3} \\
&+360\frac{b'c'c''d''}{C^3} + 360\frac{b''c'c''d'}{C^3} + 1080\frac{c'^2c''^2}{C^3} - 360\frac{b'c'^3d''}{C^4} - 360\frac{b''c'^3d'}{C^4} + 360\frac{b''c'^4}{C^4} + 360\frac{c'^4d''}{C^4} \\
&-1080\frac{b'c'^2c''d'}{C^4} + 60\cdot 24\frac{b'c'^3c''}{C^4} + 60\cdot 24\frac{c'^3c''d'}{C^4} - 60\cdot 30\frac{c'^4c''}{C^4} \\
&+24\cdot 30\frac{b'c'^4d'}{C^5} - 24\cdot 30\frac{b'c'^5}{C^5} - 24\cdot 30\frac{c'^5d'}{C^5} + 24\cdot 30\frac{c'^6}{C^5}\Big)
\end{aligned}
$$

$$+6\left(-\frac{a''''''}{C}+\frac{b''''''}{C}-\frac{c''''''}{C}+\frac{d''''''}{C}+5\frac{b'd'''''}{C^2}+5\frac{b'''''d'}{C^2}-5\frac{a'''''d'}{C^2}-5\frac{a'''''b'}{C^2}-5\frac{a'b'''''}{C^2}\right.$$

$$-5\frac{a'd'''''}{C^2}-5\frac{b'c'''''}{C^2}-5\frac{b'''''c'}{C^2}-5\frac{c'd'''''}{C^2}-5\frac{c'''''d'}{C^2}+5\frac{a'''''c'}{C^2}+5\frac{a'c'''''}{C^2}+10\frac{a'a'''''}{C^2}$$

$$+10\frac{c'c'''''}{C^2}+10\frac{b'''d''}{C^2}+10\frac{b''d'''}{C^2}-10\frac{a'''d''}{C^2}-10\frac{a'''b''}{C^2}-10\frac{a''b'''}{C^2}-10\frac{a''d'''}{C^2}-10\frac{c'''d''}{C^2}$$

$$-10\frac{b'''c''}{C^2}-10\frac{c''d'''}{C^2}-10\frac{b''c'''}{C^2}+10\frac{a'''c''}{C^2}+10\frac{a''c'''}{C^2}+20\frac{a''a'''}{C^2}+20\frac{c''c'''}{C^2}$$

$$-20\frac{a'b'''d'}{C^3}-20\frac{a'b'd'''}{C^3}-20\frac{a'''b'd'}{C^3}-20\frac{b'c'd'''}{C^3}-20\frac{b'''c'd'}{C^3}-20\frac{b'c'''d'}{C^3}$$

$$+20\frac{a'^2b'''}{C^3}+20\frac{a'^2d'''}{C^3}+20\frac{c'^2d'''}{C^3}+20\frac{b'''c'^2}{C^3}+20\frac{a'''b'c'}{C^3}+20\frac{a'''c'd'}{C^3}$$

$$+20\frac{a'b'''c'}{C^3}+20\frac{a'c'd'''}{C^3}+20\frac{a'b'c'''}{C^3}+20\frac{a'c'''d'}{C^3}-20\frac{a'''c'^2}{C^3}-20\frac{a'^2c'''}{C^3}$$

$$+40\frac{a'a'''d'}{C^3}+40\frac{a'a'''b'}{C^3}+40\frac{c'c'''d'}{C^3}+40\frac{b'c'c'''}{C^3}-40\frac{a'a'''c'}{C^3}-40\frac{a'c'c'''}{C^3}$$

$$-60\frac{a'^2a'''}{C^3}-60\frac{c'^2c'''}{C^3}$$

$$-30\frac{a''b''d'}{C^3}-30\frac{a''b'd''}{C^3}-30\frac{a'b''d''}{C^3}-30\frac{b''c''d'}{C^3}-30\frac{b'c''d''}{C^3}-30\frac{b''c'd''}{C^3}$$

$$+30\frac{a''^2b'}{C^3}+30\frac{a''^2d'}{C^3}+30\frac{b'c''^2}{C^3}+30\frac{c''^2d'}{C^3}-30\frac{a''^2c'}{C^3}-30\frac{a'c''^2}{C^3}$$

$$+30\frac{a''b''c'}{C^3}+30\frac{a'c''d''}{C^3}+30\frac{a''c'd''}{C^3}+30\frac{a'b''c''}{C^3}+30\frac{a''b'c''}{C^3}+30\frac{a''c''d'}{C^3}$$

$$+60\frac{a'a''b''}{C^3}+60\frac{a'a''d''}{C^3}+60\frac{b''c'c''}{C^3}+60\frac{c'c''d''}{C^3}-60\frac{a'a''c''}{C^3}-60\frac{a''c'c''}{C^3}$$

$$-90\frac{a'a''^2}{C^3}-90\frac{c'c''^2}{C^3}$$

$$+60\frac{a''b'c'd'}{C^4}+60\frac{a'b''c'd'}{C^4}+60\frac{a'b'c''d'}{C^4}+60\frac{a'b'c'd''}{C^4}$$

$$+60\frac{a'^2b''d'}{C^4}+60\frac{a'^2b'd''}{C^4}+60\frac{b''c'^2d'}{C^4}+60\frac{b'c'^2d''}{C^4}-60\frac{a'^3b''}{C^4}-60\frac{a'^3d''}{C^4}-60\frac{c'^3d''}{C^4}-60\frac{b''c'^3}{C^4}$$

$$-60\frac{a'^2b''c'}{C^4}-60\frac{a'^2c'd''}{C^4}-60\frac{a'^2c''d'}{C^4}-60\frac{a'c'^2d''}{C^4}-60\frac{a''b'c'^2}{C^4}-60\frac{a''c'^2d'}{C^4}$$

$$-60\frac{a'b''c'^2}{C^4}-60\frac{a'^2b'c''}{C^4}+60\frac{a''c'^3}{C^4}+60\frac{a'^3c''}{C^4}$$

$$-180\frac{a'^2a''b'}{C^4}-180\frac{a'^2a''d'}{C^4}-180\frac{b'c'^2c''}{C^4}-180\frac{c'^2c''d'}{C^4}+180\frac{a'^2a''c'}{C^4}+180\frac{a'c'^2c''}{C^4}$$

$$-120\frac{a'a''b'c'}{C^4}-120\frac{a'a''c'd'}{C^4}-120\frac{a'c'c''d'}{C^4}-120\frac{a'b'c'c''}{C^4}+120\frac{a'a''b'd'}{C^4}+120\frac{b'c'c''d'}{C^4}$$

$$+120\frac{a'^2c'c''}{C^4}+120\frac{a'a''c'^2}{C^4}+240\frac{a'^3a''}{C^4}+240\frac{c'^3c''}{C^4}$$

$$-120\frac{a'b'c'^2d'}{C^5}-120\frac{b'c'^3d'}{C^5}-120\frac{a'^3b'd'}{C^5}-120\frac{a'^2b'c'd'}{C^5}+120\frac{a'^2b'c'^2}{C^5}+120\frac{a'^2c'^2d'}{C^5}$$

$$-120\frac{a'^2c'^3}{C^5}-120\frac{a'^3c'^2}{C^5}+120\frac{a'^3c'd'}{C^5}+120\frac{a'^3b'c'}{C^5}+120\frac{a'b'c'^3}{C^5}+120\frac{a'c'^3d'}{C^5}$$

$$+120\frac{a'^4b'}{C^5}+120\frac{a'^4d'}{C^5}+120\frac{b'c'^4}{C^5}+120\frac{c'^4d'}{C^5}$$

$$-120\frac{a'c'^4}{C^5}-120\frac{a'^4c'}{C^5}-120\frac{a'^5}{C^5}-120\frac{c'^5}{C^5}$$

$$-\frac{a'''''}{C}+\frac{b'''''}{C}-\frac{c'''''}{C}+\frac{d'''''}{C}-5\frac{a''''c'}{C^2}-5\frac{a'c''''}{C^2}+5\frac{b'c''''}{C^2}+5\frac{c''''d'}{C^2}+5\frac{b''''c'}{C^2}$$

$$+5\frac{a'd''''}{C^2}+5\frac{c'd''''}{C^2}-5\frac{b'd''''}{C^2}+5\frac{a''''b'}{C^2}+5\frac{a''''d'}{C^2}+5\frac{a'b''''}{C^2}-5\frac{b''''d'}{C^2}-10\frac{b'b''''}{C^2}$$

$$-10\frac{d'd''''}{C^2}-10\frac{a''c'''}{C^2}-10\frac{a'''c''}{C^2}+10\frac{c'''d''}{C^2}+10\frac{a'''d''}{C^2}+10\frac{b''c'''}{C^2}+10\frac{a''d'''}{C^2}+10\frac{c''d'''}{C^2}$$

$$+10\frac{b'''c''}{C^2}+10\frac{a''b'''}{C^2}+10\frac{a'''b''}{C^2}-10\frac{b'''d''}{C^2}-10\frac{b''d'''}{C^2}-20\frac{d''d'''}{C^2}-20\frac{b''b'''}{C^2}$$

$$+20\frac{a'''b'c'}{C^3}+20\frac{a'b'''c'}{C^3}+20\frac{a'b'c'''}{C^3}+20\frac{a'''c'd'}{C^3}+20\frac{a'c'''d'}{C^3}+20\frac{a'c'd'''}{C^3}$$

$$-20\frac{a'''b'^2}{C^3}-20\frac{b'^2c'''}{C^3}-20\frac{a'''d'^2}{C^3}-20\frac{c'''d'^2}{C^3}+20\frac{b'''d'^2}{C^3}+20\frac{b'^2d'''}{C^3}$$

$$-20\frac{a'''b'd'}{C^2}-20\frac{a'b'''d'}{C^3}-20\frac{b'''c'd'}{C^3}-20\frac{b'c'''d'}{C^3}-20\frac{a'b'd'''}{C^3}-20\frac{b'c'd'''}{C^3}$$

$$-40\frac{a'b'b'''}{C^3}-40\frac{b'b'''c'}{C^3}-40\frac{a'd'd'''}{C^3}-40\frac{c'd'd'''}{C^3}+40\frac{b'd'd'''}{C^3}+40\frac{b'b'''d'}{C^3}$$

$$+60\frac{d'^2d'''}{C^3}+60\frac{b'^2b'''}{C^3}$$

$$+30\frac{a''b'c''}{C^3}+30\frac{a'b''c''}{C^3}+30\frac{a''b''c'}{C^3}+30\frac{a''c''d'}{C^3}+30\frac{a''c'd''}{C^3}+30\frac{a'c''d''}{C^3}$$

$$-30\frac{a'b''^2}{C^3}-30\frac{b''^2c'}{C^3}-30\frac{a'd''^2}{C^3}-30\frac{c'd''^2}{C^3}+30\frac{b'd''^2}{C^3}+30\frac{b''^2d'}{C^3}$$

$$-30\frac{b''c''d'}{C^3}-30\frac{a''b''d'}{C^3}-30\frac{a''b'd''}{C^3}-30\frac{b'c''d''}{C^3}-30\frac{a'b''d''}{C^3}-30\frac{b''c'd''}{C^3}$$

$$-60\frac{c''d'd''}{C^3}-60\frac{a''d'd''}{C^3}-60\frac{a''b'b''}{C^3}-60\frac{b'b''c''}{C^3}+60\frac{b''d'd''}{C^3}+60\frac{b'b''d''}{C^3}$$

$$+90\frac{d'd''^2}{C^3}+90\frac{b'b''^2}{C^3}$$

$$-60\frac{a''b'c'd'}{C^4}-60\frac{a'b''c'd'}{C^4}-60\frac{a'b'c''d'}{C^4}-60\frac{a'b'c'd''}{C^4}$$

$$-60\frac{a''b'^2c'}{C^4}-60\frac{a'b'^2c''}{C^4}-60\frac{a''c'd'^2}{C^4}-60\frac{a'c''d'^2}{C^4}+60\frac{a''b'^3}{C^4}+60\frac{b'^3c''}{C^4}+60\frac{c''d'^3}{C^4}+60\frac{a''d'^3}{C^4}$$

$$+60\frac{a''b'd'^2}{C^4}+60\frac{b'c''d'^2}{C^4}+60\frac{a''b'^2d'}{C^4}+60\frac{b'^2c''d'}{C^4}+60\frac{a'b'^2d''}{C^4}+60\frac{b'^2c'd''}{C^4}$$

$$+60\frac{b''c'd'^2}{C^4}+60\frac{a'b''d'^2}{C^4}-60\frac{b''d'^3}{C^4}-60\frac{b'^3d''}{C^4}$$

$$+180\frac{b'^2b''c'}{C^4}+180\frac{a'b'^2b''}{C^4}+180\frac{c'd'^2d''}{C^4}+180\frac{a'd'^2d''}{C^4}-180\frac{b'd'^2d''}{C^4}-180\frac{b'^2b''d'}{C^4}$$

$$+120\frac{a'b'b''d'}{C^4}+120\frac{b'b''c'd'}{C^4}+120\frac{b'c'd'd''}{C^4}+120\frac{a'b'd'd''}{C^4}-120\frac{a'c'd'd''}{C^4}-120\frac{a'b'b''c'}{C^4}$$

$$-120\frac{b'b''d'^2}{C^4}-120\frac{b'^2d'd''}{C^4}-240\frac{d'^3d''}{C^4}-240\frac{b'^3b''}{C^4}$$

$$-120\frac{a'b'^2d'^2}{C^5}-120\frac{a'b'd'^3}{C^5}+120\frac{a'b'c'd'^2}{C^5}-120\frac{b'^2c'd'^2}{C^5}-120\frac{b'c'd'^3}{C^5}+120\frac{a'b'^2c'd'}{C^5}$$

$$+120\frac{a'c'd'^3}{C^5}+120\frac{a'b'^3c'}{C^5}-120\frac{b'^3c'd'}{C^5}-120\frac{a'b'^3d'}{C^5}+120\frac{b'^2d'^3}{C^5}+120\frac{b'^3d'^2}{C^5}$$

$$-120\frac{a'd'^4}{C^5}-120\frac{c'd'^4}{C^5}-120\frac{a'b'^4}{C^5}-120\frac{b'^4c'}{C^5}$$

$$\left.+120\frac{b'^4d'}{C^5}+120\frac{b'd'^4}{C^5}+120\frac{b'^5}{C^5}+120\frac{d'^5}{C^5}\right)$$

+0

Merging the same kind term the 5⑥ becomes

$$-a''''''-b''''''+c''''''+d''''''+\varphi_3^{''''''}(2C)=$$

$$
\begin{aligned}
&-15\varphi_3^{'''''}\left(c'' + d'' + 2\frac{a'c'}{C} - 2\frac{b'c'}{C} + 2\frac{b'd'}{C} - 2\frac{a'd'}{C} - 8\frac{a'b'}{C}\right)\\
&-15\varphi_3''\left(+c''''' + d''''' + 4\frac{a'''c'}{C} + 4\frac{a'c'''}{C} - 4\frac{a'b'''}{C} - 4\frac{a'''b'}{C} - 4\frac{b'''c'}{C} - 4\frac{b'c'''}{C} + 4\frac{b'''d'}{C} + 4\frac{b'd'''}{C}\right.\\
&-4\frac{a'''d'}{C} - 4\frac{a'd'''}{C} - 4\frac{a'''b'}{C} - 4\frac{a'b'''}{C} + 8\frac{a'a'''}{C} + 8\frac{b'b'''}{C}\\
&-12\frac{a''b''}{C} + 6\frac{a''c''}{C} - 6\frac{a''d''}{C} - 6\frac{b''c''}{C} + 6\frac{b''d''}{C} + 6\frac{a''^2}{C} + 6\frac{b''^2}{C}\\
&-12\frac{a''b'c'}{C^2} - 12\frac{a'b''c'}{C^2} - 12\frac{a'b'c''}{C^2} + 12\frac{a''b'^2}{C^2} + 12\frac{a'^2b''}{C^2} + 12\frac{b'^2c''}{C^2} + 12\frac{a'^2d''}{C^2}\\
&-12\frac{a''b'd'}{C^2} - 12\frac{a'b''d'}{C^2} - 12\frac{a'b'd''}{C^2} - 36\frac{a'^2a''}{C^2} - 36\frac{b'^2b''}{C^2}\\
&+24\frac{a'b'^2c'}{C^3} - 24\frac{a'b'^3}{C^3} - 24\frac{b'^3c'}{C^3} + 24\frac{b'b''c'}{C^2} + 24\frac{a'b'b''}{C^2} + 24\frac{a'a''b'}{C^2} + 24\frac{a'a''d'}{C^2}\\
&\left.+24\frac{a'^2b'd'}{C^3} - 24\frac{a'^3b'}{C^3} - 24\frac{a'^3d'}{C^3} + 24\frac{a'^4}{C^3} + 24\frac{b'^4}{C^3}\right)
\end{aligned}
$$

$$
\begin{aligned}
&+\left(+12\frac{a''''''b'}{C} + 12\frac{a'b''''''}{C} - 12\frac{c'd''''''}{C} - 12\frac{c''''''d'}{C} - 12\frac{a'a''''''}{C} - 12\frac{b'b''''''}{C} + 12\frac{c'c''''''}{C} + 12\frac{d'd''''''}{C}\right.\\
&+30\frac{a''b'''''}{C} + 30\frac{a'''''b''}{C} - 30\frac{c'''''d''}{C} - 30\frac{c''d'''''}{C} - 30\frac{a''a'''''}{C} - 30\frac{b''b'''''}{C} + 30\frac{c''c'''''}{C} + 30\frac{d''d'''''}{C}\\
&+30\frac{a'''''b'c'}{C^2} + 30\frac{a'b'''''c'}{C^2} + 30\frac{a'b'c'''''}{C^2} + 30\frac{a'''''b'd'}{C^2} + 30\frac{a'b'''''d'}{C^2} + 30\frac{a'b'd'''''}{C^2}\\
&-30\frac{a'''''c'd'}{C^2} - 30\frac{a'c'''''d'}{C^2} - 30\frac{a'c'd'''''}{C^2} - 30\frac{b'''''c'd'}{C^2} - 30\frac{b'c'''''d'}{C^2} - 30\frac{b'c'd'''''}{C^2}\\
&-30\frac{a'^2b'''''}{C^2} - 30\frac{a'''''b'^2}{C^2} - 30\frac{a'^2d'''''}{C^2} + 30\frac{a'''''d'^2}{C^2} + 30\frac{b'''''c'^2}{C^2} - 30\frac{b'^2c'''''}{C^2} + 30\frac{c'^2d'''''}{C^2} + 30\frac{c'''''d'^2}{C^2}\\
&-60\frac{a'a'''''b'}{C^2} - 60\frac{a'a'''''d'}{C^2} - 60\frac{a'b'b'''''}{C^2} + 60\frac{a'd'd'''''}{C^2} - 60\frac{b'b'''''c'}{C^2} + 60\frac{b'c'c'''''}{C^2} + 60\frac{c'c'''''d'}{C^2} + 60\frac{c'd'd'''''}{C^2}\\
&+90\frac{a'^2a'''''}{C^2} + 90\frac{b'^2b'''''}{C^2} - 90\frac{c'^2c'''''}{C^2} - 90\frac{d'^2d'''''}{C^2}
\end{aligned}
$$

$$+40\frac{a'''b'''}{C}-40\frac{c'''d'''}{C}-20\frac{{a'''}^{2}}{C}-20\frac{{b'''}^{2}}{C}+20\frac{{c'''}^{2}}{C}+20\frac{{d'''}^{2}}{C}$$

$$+60\frac{a'''b'c''}{C^2}+60\frac{a''b'c'''}{C^2}+60\frac{a'b''c'''}{C^2}+60\frac{a'''b''c'}{C^2}+60\frac{a''b'''c'}{C^2}+60\frac{a'b'''c''}{C^2}$$

$$+60\frac{a'b''d'''}{C^2}+60\frac{a'b'''d''}{C^2}+60\frac{a'''b''d'}{C^2}+60\frac{a'''b'd''}{C^2}+60\frac{a''b'''d'}{C^2}+60\frac{a''b'd'''}{C^2}$$

$$-60\frac{a'c''d'''}{C^2}-60\frac{a'c'''d''}{C^2}-60\frac{a''c'd'''}{C^2}-60\frac{a''c'''d'}{C^2}-60\frac{a'''c''d'}{C^2}-60\frac{a'''c'd''}{C^2}$$

$$-60\frac{b''c'd'''}{C^2}-60\frac{b'''c''d'}{C^2}-60\frac{b'''c'd''}{C^2}-60\frac{b''c'''d'}{C^2}-60\frac{b'c'''d''}{C^2}-60\frac{b'c''d'''}{C^2}$$

$$-120\frac{a'a'''b''}{C^2}-120\frac{a'a''b'''}{C^2}-120\frac{a''a'''b'}{C^2}-120\frac{a''a'''d'}{C^2}-120\frac{a'a''d'''}{C^2}-120\frac{a'a'''d''}{C^2}$$

$$-120\frac{a'''b'b''}{C^2}-120\frac{a'b''b'''}{C^2}-120\frac{a''b'b'''}{C^2}+120\frac{a'''d'd''}{C^2}+120\frac{a''d'd'''}{C^2}+120\frac{a'd''d'''}{C^2}$$

$$-120\frac{b'b'''c''}{C^2}-120\frac{b'b''c'''}{C^2}-120\frac{b''b'''c'}{C^2}+120\frac{b'''c'c''}{C^2}+120\frac{b'c''c'''}{C^2}+120\frac{b''c'c'''}{C^2}$$

$$+120\frac{c'c'''d''}{C^2}+120\frac{c'c''d'''}{C^2}+120\frac{c''c'''d'}{C^2}+120\frac{c'''d'd''}{C^2}+120\frac{c''d'd'''}{C^2}+120\frac{c'd''d'''}{C^2}$$

$$+360\frac{a'a''a'''}{C^2}+360\frac{b'b''b'''}{C^2}-360\frac{c'c''c'''}{C^2}-360\frac{d'd''d'''}{C^2}$$

$$-120\frac{a'''{b'}^{2}c'}{C^3}-120\frac{a'{b'}^{2}c'''}{C^3}-120\frac{{a'}^{2}b'd'''}{C^3}-120\frac{{a'}^{2}b'''d'}{C^3}+120\frac{a'''c'{d'}^{2}}{C^3}+120\frac{a'c'''{d'}^{2}}{C^3}+120\frac{b'{c'}^{2}d'''}{C^3}+120\frac{b'''{c'}^{2}d'}{C^3}$$

$$+120\frac{a'''{b'}^{3}}{C^3}+120\frac{{a'}^{3}b'''}{C^3}+120\frac{{a'}^{3}d'''}{C^3}-120\frac{a'''{d'}^{3}}{C^3}+120\frac{{b'}^{3}c'''}{C^3}-120\frac{b'''{c'}^{3}}{C^3}-120\frac{{c'}^{3}d'''}{C^3}-120\frac{c'''{d'}^{3}}{C^3}$$

$$-240\frac{a'a'''b'd'}{C^3}-240\frac{a'b'b'''c'}{C^3}+240\frac{a'c'd'd'''}{C^3}+240\frac{b'c'c'''d'}{C^3}-480\frac{{a'}^{3}a'''}{C^3}-480\frac{{b'}^{3}b'''}{C^3}+480\frac{{c'}^{3}c'''}{C^3}+480\frac{{d'}^{3}d'''}{C^3}$$

$$+360\frac{{a'}^{2}a'''b'}{C^3}+360\frac{{a'}^{2}a'''d'}{C^3}+360\frac{a'{b'}^{2}b'''}{C^3}-360\frac{a'{d'}^{2}d'''}{C^3}+360\frac{{b'}^{2}b'''c'}{C^3}-360\frac{b'{c'}^{2}c'''}{C^3}-360\frac{{c'}^{2}c'''d'}{C^3}-360\frac{c'{d'}^{2}d'''}{C^3}$$

$$+90\frac{a''b''c''}{C^2}+90\frac{a''b''d''}{C^2}-90\frac{a''c''d''}{C^2}-90\frac{b''c''d''}{C^2}-90\frac{a''{b''}^{2}}{C^2}-90\frac{{a''}^{2}b''}{C^2}+90\frac{a''{d''}^{2}}{C^2}-90\frac{{a''}^{2}d''}{C^2}$$

$$-90\frac{{b''}^{2}c''}{C^2}+90\frac{b''{c''}^{2}}{C^2}+90\frac{c''{d''}^{2}}{C^2}+90\frac{{c''}^{2}d''}{C^2}+90\frac{{a''}^{3}}{C^2}+90\frac{{b''}^{3}}{C^2}-90\frac{{c''}^{3}}{C^2}-90\frac{{d''}^{3}}{C^2}$$

$$-180\frac{a'b''^2c'}{C^3}-180\frac{a''b'^2c''}{C^3}-180\frac{a'^2b''d''}{C^3}-180\frac{a''^2b'd'}{C^3}$$

$$+180\frac{a''c''d'^2}{C^3}+180\frac{a'c'd''^2}{C^3}+180\frac{b''c'^2d''}{C^3}+180\frac{b'c''^2d'}{C^3}$$

$$-360\frac{a'a''b'd''}{C^3}-360\frac{a'a''b''d'}{C^3}-360\frac{a'b'b''c''}{C^3}-360\frac{a''b'b''c'}{C^3}$$

$$+360\frac{a'c''d'd''}{C^3}+360\frac{a''c'd'd''}{C^3}+360\frac{b'c'c''d''}{C^3}+360\frac{b''c'c''d'}{C^3}$$

$$+540\frac{a'^2a''b''}{C^3}+540\frac{a'a''^2b'}{C^3}+540\frac{a'a''^2d'}{C^3}+540\frac{a'^2a''d''}{C^3}$$

$$+540\frac{a''b'^2b''}{C^3}+540\frac{a'b'b''^2}{C^3}-540\frac{a'd'd''^2}{C^3}-540\frac{a''d'^2d''}{C^3}$$

$$+540\frac{b'^2b''c''}{C^3}+540\frac{b'b''^2c'}{C^3}-540\frac{b'c'c''^2}{C^3}-540\frac{b''c'^2c''}{C^3}$$

$$-540\frac{c'c''^2d'}{C^3}-540\frac{c'^2c''d''}{C^3}-540\frac{c'd'd''^2}{C^3}-540\frac{c''d'^2d''}{C^3}$$

$$-1080\frac{a'^2a''^2}{C^3}-1080\frac{b'^2b''^2}{C^3}+1080\frac{c'^2c''^2}{C^3}+1080\frac{d'^2d''^2}{C^3}$$

$$-360\frac{a'^4b''}{C^4}-360\frac{a''b'^4}{C^4}-360\frac{a'^4d''}{C^4}+360\frac{a''d'^4}{C^4}-360\frac{b'^4c''}{C^4}+360\frac{b''c'^4}{C^4}+360\frac{c'^4d''}{C^4}+360\frac{c''d'^4}{C^4}$$

$$+360\frac{a''b'^3c'}{C^4}+360\frac{a'b'^3c''}{C^4}+360\frac{a'^3b''d'}{C^4}+360\frac{a'^3b'd''}{C^4}-360\frac{a''c'd'^3}{C^4}-360\frac{a'c''d'^3}{C^4}-360\frac{b'c'^3d''}{C^4}-360\frac{b''c'^3d'}{C^4}$$

$$-1440\frac{a'^3a''b'}{C^4}-1440\frac{a'^3a''d'}{C^4}-1440\frac{a'b'^3b''}{C^4}+1440\frac{a'd'^3d''}{C^4}$$

$$-1440\frac{b'^3b''c'}{C^4}+1440\frac{b'c'^3c''}{C^4}+1440\frac{c'^3c''d'}{C^4}+1440\frac{c'd'^3d''}{C^4}$$

$$+1080\frac{a'^2a''b'd'}{C^4}+1080\frac{a'b'^2b''c'}{C^4}-1080\frac{a'c'd'^2d''}{C^4}-1080\frac{b'c'^2c''d'}{C^4}$$

$$+1800\frac{a'^4a''}{C^4}+1800\frac{b'^4b''}{C^4}-1800\frac{c'^4c''}{C^4}-1800\frac{d'^4d''}{C^4}$$

$$-720\frac{a'b'^4c'}{C^5}-720\frac{a'^4b'd'}{C^5}+720\frac{a'c'd'^4}{C^5}+720\frac{b'c'^4d'}{C^5}+720\frac{a'b'^5}{C^5}+720\frac{a'^5b'}{C^5}-720\frac{a'd'^5}{C^5}$$

$$+720\frac{a'^5d'}{C^5}-720\frac{b'c'^5}{C^5}+720\frac{b'^5c'}{C^5}-720\frac{c'd'^5}{C^5}-720\frac{c'^5d'}{C^5}$$

$$\left.-720\frac{a'^6}{C^5}-720\frac{b'^6}{C^5}+720\frac{c'^6}{C^5}+720\frac{d'^6}{C^5}\right)$$

$$+6\left(-2\frac{a'''''}{C}+2\frac{b'''''}{C}-2\frac{c'''''}{C}+2\frac{d'''''}{C}+10\frac{a'a''''}{C^2}-10\frac{b'b''''}{C^2}+10\frac{c'c''''}{C^2}-10\frac{d'd''''}{C^2}\right.$$

$$+20\frac{a''a'''}{C^2}-20\frac{b''b'''}{C^2}+20\frac{c''c'''}{C^2}-20\frac{d''d'''}{C^2}+20\frac{a'^2b'''}{C^3}-20\frac{a'''b'^2}{C^3}-20\frac{a'''d'^2}{C^3}+20\frac{a'^2d'''}{C^3}$$

$$-20\frac{a'''c'^2}{C^3}-20\frac{a'^2c'''}{C^3}+20\frac{b'''c'^2}{C^3}-20\frac{b'^2c'''}{C^3}+20\frac{b'''d'^2}{C^3}+20\frac{b'^2d'''}{C^3}+20\frac{c'^2d'''}{C^3}-20\frac{c'''d'^2}{C^3}$$

$$+40\frac{a'''b'c'}{C^3}+40\frac{a'b'''c'}{C^3}+40\frac{a'b'c'''}{C^3}-40\frac{a'''b'd'}{C^2}-40\frac{a'b'''d'}{C^3}-40\frac{a'b'd'''}{C^3}$$

$$+40\frac{a'''c'd'}{C^3}+40\frac{a'c'''d'}{C^3}+40\frac{a'c'd'''}{C^3}-40\frac{b'''c'd'}{C^3}-40\frac{b'c'''d'}{C^3}-40\frac{b'c'd'''}{C^3}$$

$$+40\frac{a'a'''b'}{C^3}-40\frac{a'a'''c'}{C^3}+40\frac{a'a'''d'}{C^3}-40\frac{a'b'b'''}{C^3}-40\frac{a'c'c'''}{C^3}-40\frac{a'd'd'''}{C^3}-40\frac{b'b'''c'}{C^3}$$

$$+40\frac{b'b'''d'}{C^3}+40\frac{b'c'c'''}{C^3}+40\frac{b'd'd'''}{C^3}+40\frac{c'c'''d'}{C^3}-40\frac{c'd'd'''}{C^3}$$

$$-60\frac{a'^2a'''}{C^3}+60\frac{b'^2b'''}{C^3}-60\frac{c'^2c'''}{C^3}+60\frac{d'^2d'''}{C^3}$$

$$+30\frac{a''^2b'}{C^3}-30\frac{a'b''^2}{C^3}-30\frac{a''^2c'}{C^3}-30\frac{a'c''^2}{C^3}+30\frac{a''^2d'}{C^3}-30\frac{a'd''^2}{C^3}+30\frac{b'c''^2}{C^3}-30\frac{b''^2c'}{C^3}$$

$$+30\frac{b'd''^2}{C^3}+30\frac{b''^2d'}{C^3}-30\frac{c'd''^2}{C^3}+30\frac{c''^2d'}{C^3}$$

$$+60\frac{a''b''c'}{C^3}+60\frac{a''b'c''}{C^3}+60\frac{a'b''c''}{C^3}-60\frac{a''b''d'}{C^3}-60\frac{a''b'd''}{C^3}-60\frac{a'b''d''}{C^3}$$

$$+60\frac{a''c''d'}{C^3}+60\frac{a''c'd''}{C^3}+60\frac{a'c''d''}{C^3}-60\frac{b''c''d'}{C^3}-60\frac{b''c'd''}{C^3}-60\frac{b'c''d''}{C^3}$$

$$+60\frac{a'a''b''}{C^3}-60\frac{a'a''c''}{C^3}+60\frac{a'a''d''}{C^3}-60\frac{a''b'b''}{C^3}-60\frac{a''c'c''}{C^3}-60\frac{a''d'd''}{C^3}-60\frac{b'b''c''}{C^3}$$

$$+60\frac{b'b''d''}{C^3}+60\frac{b''c'c''}{C^3}+60\frac{b''d'd''}{C^3}+60\frac{c'c''d''}{C^3}-60\frac{c''d'd''}{C^3}$$

$$-90\frac{a'a''^2}{C^3}-90\frac{c'c''^2}{C^3}+90\frac{d'd''^2}{C^3}+90\frac{b'b''^2}{C^3}$$

$$-60\frac{a''b'^2c'}{C^4}-60\frac{a''b'c'^2}{C^4}-60\frac{a'b''c'^2}{C^4}-60\frac{a'^2b''c'}{C^4}-60\frac{a'^2b'c''}{C^4}-60\frac{a'b'^2c''}{C^4}$$

$$+60\frac{a''b'd'^2}{C^4}+60\frac{a''b'^2d'}{C^4}+60\frac{a'^2b''d'}{C^4}+60\frac{a'^2b'd''}{C^4}+60\frac{a'b'^2d''}{C^4}+60\frac{a'b''d'^2}{C^4}$$

$$-60\frac{a''c'd'^2}{C^4}-60\frac{a'c''d'^2}{C^4}-60\frac{a'^2c'd''}{C^4}-60\frac{a'^2c''d'}{C^4}-60\frac{a'c'^2d''}{C^4}-60\frac{a''c'^2d'}{C^4}$$

$$+60\frac{b'c''d'^2}{C^4}+60\frac{b'^2c''d'}{C^4}+60\frac{b'^2c'd''}{C^4}+60\frac{b''c'd'^2}{C^4}+60\frac{b''c'^2d'}{C^4}+60\frac{b'c'^2d''}{C^4}$$

$$+60\frac{a''b'^3}{C^4}-60\frac{a'^3b''}{C^4}+60\frac{a''c'^3}{C^4}+60\frac{a'^3c''}{C^4}-60\frac{a'^3d''}{C^4}+60\frac{a''d'^3}{C^4}-60\frac{b''d'^3}{C^4}-60\frac{b'^3d''}{C^4}$$

$$-60\frac{b''c'^3}{C^4}+60\frac{b'^3c''}{C^4}+60\frac{c''d'^3}{C^4}-60\frac{c'^3d''}{C^4}$$

$$-120\frac{a'a''b'c'}{C^4}-120\frac{a'a''c'd'}{C^4}-120\frac{a'c'c''d'}{C^4}-120\frac{a'b'c'c''}{C^4}+120\frac{a'a''b'd'}{C^4}-120\frac{a'b'b''c'}{C^4}$$

$$+120\frac{a'b'b''d'}{C^4}+120\frac{a'b'd'd''}{C^4}-120\frac{a'c'd'd''}{C^4}+120\frac{b'b''c'd'}{C^4}+120\frac{b'c'c''d'}{C^4}+120\frac{b'c'd'd''}{C^4}$$

$$+120\frac{a'a''c'^2}{C^4}+120\frac{a'^2c'c''}{C^4}-120\frac{b'b''d'^2}{C^4}-120\frac{b'^2d'd''}{C^4}$$

$$-180\frac{a'^2a''b'}{C^4}+180\frac{a'^2a''c'}{C^4}-180\frac{a'^2a''d'}{C^4}+180\frac{a'b'^2b''}{C^4}+180\frac{a'c'^2c''}{C^4}+180\frac{a'd'^2d''}{C^4}$$

$$+180\frac{b'^2b''c'}{C^4}-180\frac{b'^2b''d'}{C^4}-180\frac{b'c'^2c''}{C^4}-180\frac{b'd'^2d''}{C^4}-180\frac{c'^2c''d'}{C^4}+180\frac{c'd'^2d''}{C^4}$$

$$+240\frac{a'^3a''}{C^4}-240\frac{b'^3b''}{C^4}+240\frac{c'^3c''}{C^4}-240\frac{d'^3d''}{C^4}$$

$$-120\frac{a'^2b'c'd'}{C^5}+120\frac{a'b'^2c'd'}{C^5}-120\frac{a'b'c'^2d'}{C^5}+120\frac{a'b'c'd'^2}{C^5}$$

$$+120\frac{a'^3b'c'}{C^5}+120\frac{a'b'^3c'}{C^5}+120\frac{a'b'c'^3}{C^5}-120\frac{a'^3b'd'}{C^5}-120\frac{a'b'^3d'}{C^5}-120\frac{a'b'd'^3}{C^5}$$

$$+120\frac{a'^3c'd'}{C^5}+120\frac{a'c'^3d'}{C^5}+120\frac{a'c'd'^3}{C^5}-120\frac{b'^3c'd'}{C^5}-120\frac{b'c'^3d'}{C^5}-120\frac{b'c'd'^3}{C^5}$$

$$+120\frac{a'^2b'c'^2}{C^5}-120\frac{a'b'^2d'^2}{C^5}+120\frac{a'^2c'^2d'}{C^5}-120\frac{b'^2c'd'^2}{C^5}$$

$$-120\frac{a'^2c'^3}{C^5}-120\frac{a'^3c'^2}{C^5}+120\frac{b'^2d'^3}{C^5}+120\frac{b'^3d'^2}{C^5}$$

$$+120\frac{a'^4b'}{C^5}-120\frac{a'b'^4}{C^5}-120\frac{a'c'^4}{C^5}-120\frac{a'^4c'}{C^5}+120\frac{a'^4d'}{C^5}-120\frac{a'd'^4}{C^5}-120\frac{b'^4c'}{C^5}+120\frac{b'c'^4}{C^5}$$

$$+120\frac{b'^4d'}{C^5}+120\frac{b'd'^4}{C^5}+120\frac{c'^4d'}{C^5}-120\frac{c'd'^4}{C^5}$$

$$-120\frac{a'^5}{C^5}-120\frac{c'^5}{C^5}+120\frac{b'^5}{C^5}+120\frac{d'^5}{C^5}\Bigg)$$

Then, we can get:

The 1st five simultaneous equations 1① 2① 3① 4① 5① is

$$\begin{pmatrix} 1 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 1 & 0 \\ (-1) & 1 & 1 & (-1) & 0 \\ \frac{1}{\sigma} & \frac{(-1)}{\sigma} & 1 & (-1) & 0 \\ (-1) & (-1) & 1 & 1 & 2C \end{pmatrix}\begin{pmatrix} a' \\ b' \\ c' \\ d' \\ \varphi_3' \end{pmatrix}=\begin{pmatrix} 0 \\ 0 \\ 2 \\ 0 \\ 0 \end{pmatrix}$$

The 2nd five simultaneous equations 1② 2② 3② 4② 5② is

$$\begin{pmatrix} 1 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 1 & 0 \\ (-1) & 1 & 1 & (-1) & 0 \\ \frac{1}{\sigma} & \frac{(-1)}{\sigma} & 1 & (-1) & 0 \\ (-1) & (-1) & 1 & 1 & 2C \end{pmatrix}\begin{pmatrix} a'' \\ b'' \\ c'' \\ d'' \\ \varphi_3'' \end{pmatrix}=\begin{pmatrix} \frac{(-4)a'b'}{C} \\ \frac{(-4)c'd'}{C} \\ \frac{2(a'd'-b'c')}{C} \\ (d'-c')\varphi_3' \\ \frac{8(a'b'-c'd')+4(-a'+b'-c'+d')}{C} \end{pmatrix}$$

The 3rd five simultaneous equations 1③ 2③ 3③ 4③ 5③ is

$$\begin{pmatrix} 1 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 1 & 0 \\ (-1) & 1 & 1 & (-1) & 0 \\ \frac{1}{\sigma} & \frac{(-1)}{\sigma} & 1 & (-1) & 0 \\ (-1) & (-1) & 1 & 1 & 2C \end{pmatrix} \begin{pmatrix} a''' \\ b''' \\ c''' \\ d''' \\ \varphi_3''' \end{pmatrix} = \begin{pmatrix} \frac{6(a'a''+b'b'')}{C} \\ \frac{6(c'c''+d'd'')}{C} \\ \frac{3(a''d'+a'd''-b'c''-b''c'+c''+d'')}{C} \\ \frac{3}{2}\left[(d''-c'')\varphi_3' + \frac{(c'-d')}{2}\varphi_3'^2 + (d'-c')\varphi_3''\right] \\ \frac{6}{C}\left[\begin{matrix} \frac{a'd'(d'-a')+b'c'(c'-b')}{C} - a'' + b'' - c'' \\ + d'' + (c'-d')(c''-d'') - (a'-b')(a''-b'') \end{matrix}\right] \end{pmatrix}$$

The 4th five simultaneous equations 1④ 2④ 3④ 4④ 5④ is

$$\begin{pmatrix} 1 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 1 & 0 \\ (-1) & 1 & 1 & (-1) & 0 \\ \frac{1}{\sigma} & \frac{(-1)}{\sigma} & 1 & (-1) & 0 \\ (-1) & (-1) & 1 & 1 & 2C \end{pmatrix} \begin{pmatrix} a'''' \\ b'''' \\ c'''' \\ d'''' \\ \varphi_3'''' \end{pmatrix} =$$

$$\begin{pmatrix} \frac{6}{C}\left(a''^2+b''^2\right) + \frac{8}{C}\left(a'a'''+b'b'''\right) - \frac{36}{C^2}\left(a'^2a''+b'^2b''\right) + \frac{24}{C^3}\left(a'^4+b'^4\right) \\ \frac{6}{C}\left(c''^2+d''^2\right) + \frac{8}{C}\left(c'c'''+d'''d'\right) - \frac{36}{C^2}\left(c'^2c''+d'^2d''\right) + \frac{24}{C^3}\left(c'^4+d'^4\right) \\ \frac{4(a'''d'+a'd''')+6(a''d''-b''c'')-4(b'c'''+b'''c')+4(c'''+d''')}{C} \\ 3(d''-c'')\varphi_3''+2(d'-c')\varphi_3''' \\ (\cdots\cdots) \end{pmatrix}$$

In fact we can easily find out

$$\begin{pmatrix} 1 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 1 & 0 \\ (-1) & 1 & 1 & (-1) & 0 \\ \frac{1}{\sigma} & \frac{(-1)}{\sigma} & 1 & (-1) & 0 \\ (-1) & (-1) & 1 & 1 & 2C \end{pmatrix}^{-1} = \begin{pmatrix} 1 & 0 & \frac{(-1)\sigma}{(1+\sigma)} & \frac{\sigma}{(1+\sigma)} & 0 \\ 1 & 0 & \frac{\sigma}{(1+\sigma)} & \frac{(-1)\sigma}{(1+\sigma)} & 0 \\ 0 & 1 & \frac{1}{(1+\sigma)} & \frac{\sigma}{(1+\sigma)} & 0 \\ 0 & 1 & \frac{(-1)}{(1+\sigma)} & \frac{(-1)\sigma}{(1+\sigma)} & 0 \\ \frac{1}{C} & \frac{(-1)}{C} & 0 & 0 & \frac{1}{C} \end{pmatrix} \frac{1}{2}$$

Then we get

$$\begin{pmatrix} a' \\ b' \\ c' \\ d' \\ \varphi_3' \end{pmatrix} = \begin{pmatrix} 1 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 1 & 0 \\ (-1) & 1 & 1 & (-1) & 0 \\ \frac{1}{\sigma} & \frac{(-1)}{\sigma} & 1 & (-1) & 0 \\ (-1) & (-1) & 1 & 1 & 2C \end{pmatrix}^{-1} \begin{pmatrix} 0 \\ 0 \\ 2 \\ 0 \\ 0 \end{pmatrix} = \begin{pmatrix} 1 & 0 & \frac{(-1)\sigma}{(1+\sigma)} & \frac{\sigma}{(1+\sigma)} & 0 \\ 1 & 0 & \frac{\sigma}{(1+\sigma)} & \frac{(-1)\sigma}{(1+\sigma)} & 0 \\ 0 & 1 & \frac{1}{(1+\sigma)} & \frac{\sigma}{(1+\sigma)} & 0 \\ 0 & 1 & \frac{(-1)}{(1+\sigma)} & \frac{(-1)\sigma}{(1+\sigma)} & 0 \\ \frac{1}{C} & \frac{(-1)}{C} & 0 & 0 & \frac{1}{C} \end{pmatrix} \frac{1}{2} \begin{pmatrix} 0 \\ 0 \\ 2 \\ 0 \\ 0 \end{pmatrix}$$

$$= \begin{pmatrix} 1 & 0 & \frac{(-1)\sigma}{(1+\sigma)} & \frac{\sigma}{(1+\sigma)} & 0 \\ 1 & 0 & \frac{\sigma}{(1+\sigma)} & \frac{(-1)\sigma}{(1+\sigma)} & 0 \\ 0 & 1 & \frac{1}{(1+\sigma)} & \frac{\sigma}{(1+\sigma)} & 0 \\ 0 & 1 & \frac{(-1)}{(1+\sigma)} & \frac{(-1)\sigma}{(1+\sigma)} & 0 \\ \frac{1}{C} & \frac{(-1)}{C} & 0 & 0 & \frac{1}{C} \end{pmatrix} \begin{pmatrix} 0 \\ 0 \\ 1 \\ 0 \\ 0 \end{pmatrix} = \begin{pmatrix} \frac{(-1)\sigma}{(1+\sigma)} \\ \frac{\sigma}{(1+\sigma)} \\ \frac{1}{(1+\sigma)} \\ \frac{(-1)}{(1+\sigma)} \\ 0 \end{pmatrix} = \begin{pmatrix} (-\sigma) \\ \sigma \\ 1 \\ (-1) \\ 0 \end{pmatrix} \frac{1}{(1+\sigma)}$$

With the result of $\begin{pmatrix} a' \\ b' \\ c' \\ d' \\ \varphi_3' \end{pmatrix}$ we can find out $\begin{pmatrix} \frac{(-4)a'b'}{C} \\ \frac{(-4)c'd'}{C} \\ \frac{2(a'd'-b'c')}{C} \\ (d'-c')\varphi_3' \\ \frac{8(a'b'-c'd')+4(-a'+b'-c'+d')}{C} \end{pmatrix}$

$$= \begin{pmatrix} \frac{(-4)(-1)\sigma^2}{C(1+\sigma)^2} \\ \frac{(-4)(-1)}{C(1+\sigma)^2} \\ 0 \\ 0 \\ 0 \end{pmatrix} = \begin{pmatrix} \sigma^2 \\ 1 \\ 0 \\ 0 \\ 0 \end{pmatrix} \frac{4}{C(1+\sigma)^2}$$

Then we get

$$\begin{pmatrix} a'' \\ b'' \\ c'' \\ d'' \\ \varphi_3'' \end{pmatrix} = \begin{pmatrix} 1 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 1 & 0 \\ (-1) & 1 & 1 & (-1) & 0 \\ \frac{1}{\sigma} & \frac{(-1)}{\sigma} & 1 & (-1) & 0 \\ (-1) & (-1) & 1 & 1 & 2C \end{pmatrix}^{-1} \begin{pmatrix} \sigma^2 \\ 1 \\ 0 \\ 0 \\ 0 \end{pmatrix} \frac{4}{C(1+\sigma)^2}$$

$$= \begin{pmatrix} 1 & 0 & \frac{(-1)\sigma}{(1+\sigma)} & \frac{\sigma}{(1+\sigma)} & 0 \\ 1 & 0 & \frac{\sigma}{(1+\sigma)} & \frac{(-1)\sigma}{(1+\sigma)} & 0 \\ 0 & 1 & \frac{1}{(1+\sigma)} & \frac{\sigma}{(1+\sigma)} & 0 \\ 0 & 1 & \frac{(-1)}{(1+\sigma)} & \frac{(-1)\sigma}{(1+\sigma)} & 0 \\ \frac{1}{C} & \frac{(-1)}{C} & 0 & 0 & \frac{1}{C} \end{pmatrix} \frac{1}{2} \begin{pmatrix} \sigma^2 \\ 1 \\ 0 \\ 0 \\ 0 \end{pmatrix} \frac{4}{C(1+\sigma)^2}$$

$$= \begin{pmatrix} 1 & 0 & \frac{(-1)\sigma}{(1+\sigma)} & \frac{\sigma}{(1+\sigma)} & 0 \\ 1 & 0 & \frac{\sigma}{(1+\sigma)} & \frac{(-1)\sigma}{(1+\sigma)} & 0 \\ 0 & 1 & \frac{1}{(1+\sigma)} & \frac{\sigma}{(1+\sigma)} & 0 \\ 0 & 1 & \frac{(-1)}{(1+\sigma)} & \frac{(-1)\sigma}{(1+\sigma)} & 0 \\ \frac{1}{C} & \frac{(-1)}{C} & 0 & 0 & \frac{1}{C} \end{pmatrix} \begin{pmatrix} \sigma^2 \\ 1 \\ 0 \\ 0 \\ 0 \end{pmatrix} \frac{2}{C(1+\sigma)^2} = \begin{pmatrix} \sigma^2 \\ \sigma^2 \\ 1 \\ 1 \\ \frac{(\sigma^2-1)}{C} \end{pmatrix} \frac{2}{C(1+\sigma)^2}$$

With the result of $\begin{pmatrix} a' \\ b' \\ c' \\ d' \\ \varphi_3' \end{pmatrix}$ and $\begin{pmatrix} a'' \\ b'' \\ c'' \\ d'' \\ \varphi_3'' \end{pmatrix}$ we can find out

$$\begin{pmatrix} \dfrac{6(a'a''+b'b'')}{C} \\ \dfrac{6(c'c''+d'd'')}{C} \\ \dfrac{3(a''d'+a'd''-b'c''-b''c'+c''+d'')}{C} \\ \dfrac{3}{2}\left[(d''-c'')\varphi_3'+\dfrac{(c'-d')}{2}\varphi_3'^2+(d'-c')\varphi_3''\right] \\ \dfrac{6}{C}\left[\begin{matrix}\dfrac{a'd'(d'-a')+b'c'(c'-b')}{C}-a''+b''-c'' \\ +d''+(c'-d')(c''-d'')-(a'-b')(a''-b'')\end{matrix}\right] \end{pmatrix}$$

$$= \begin{pmatrix} \dfrac{6[(-1)\sigma^3+\sigma^3]2}{C^2(1+\sigma)^3} \\ \dfrac{6[1\cdot 1+(-1)1]2}{C^2(1+\sigma)^3} \\ \dfrac{3}{C}\left[\dfrac{(-2\sigma^2-2\sigma)2}{C(1+\sigma)^3}+\dfrac{(1+1)2}{C(1+\sigma)^2}\right] \\ \dfrac{3}{2}\left[0+0+\left(\dfrac{-1}{1+\sigma}-\dfrac{1}{1+\sigma}\right)\dfrac{2(\sigma-1)}{C^2(1+\sigma)}\right] \\ \dfrac{6}{C}\left[\begin{matrix}\dfrac{(-\sigma)(-1)(\sigma-1)+\sigma\cdot 1(1-\sigma)}{C(1+\sigma)^3}+\dfrac{2(-\sigma^2+\sigma^2-1+1)}{C(1+\sigma)^2} \\ +\dfrac{2[1-(-1)](1-1)}{C(1+\sigma)^3}-\dfrac{2[(-\sigma)-\sigma](\sigma^2-\sigma^2)}{C(1+\sigma)^3}\end{matrix}\right] \end{pmatrix} = \begin{pmatrix} 0 \\ 0 \\ \dfrac{12(1-\sigma)}{C^2(1+\sigma)^2} \\ \dfrac{6(1-\sigma)}{C^2(1+\sigma)^2} \\ 0 \end{pmatrix}$$

$$= \begin{pmatrix} 0 \\ 0 \\ 2 \\ 1 \\ 0 \end{pmatrix} \frac{6(1-\sigma)}{C^2(1+\sigma)^2}$$

Then we get

$$\begin{pmatrix} a''' \\ b''' \\ c''' \\ d''' \\ \varphi_3''' \end{pmatrix} = \begin{pmatrix} 1 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 1 & 0 \\ (-1) & 1 & 1 & (-1) & 0 \\ \dfrac{1}{\sigma} & \dfrac{(-1)}{\sigma} & 1 & (-1) & 0 \\ (-1) & (-1) & 1 & 1 & 2C \end{pmatrix}^{-1} \begin{pmatrix} 0 \\ 0 \\ 2 \\ 1 \\ 0 \end{pmatrix} \frac{6(1-\sigma)}{C^2(1+\sigma)^2}$$

$$=\begin{pmatrix} 1 & 0 & \frac{(-1)\sigma}{(1+\sigma)} & \frac{\sigma}{(1+\sigma)} & 0 \\ 1 & 0 & \frac{\sigma}{(1+\sigma)} & \frac{(-1)\sigma}{(1+\sigma)} & 0 \\ 0 & 1 & \frac{1}{(1+\sigma)} & \frac{\sigma}{(1+\sigma)} & 0 \\ 0 & 1 & \frac{(-1)}{(1+\sigma)} & \frac{(-1)\sigma}{(1+\sigma)} & 0 \\ \frac{1}{C} & \frac{(-1)}{C} & 0 & 0 & \frac{1}{C} \end{pmatrix} \frac{1}{2}\begin{pmatrix} 0 \\ 0 \\ 2 \\ 1 \\ 0 \end{pmatrix} \frac{6(1-\sigma)}{C^2(1+\sigma)^2}$$

$$=\begin{pmatrix} 1 & 0 & \frac{(-1)\sigma}{(1+\sigma)} & \frac{\sigma}{(1+\sigma)} & 0 \\ 1 & 0 & \frac{\sigma}{(1+\sigma)} & \frac{(-1)\sigma}{(1+\sigma)} & 0 \\ 0 & 1 & \frac{1}{(1+\sigma)} & \frac{\sigma}{(1+\sigma)} & 0 \\ 0 & 1 & \frac{(-1)}{(1+\sigma)} & \frac{(-1)\sigma}{(1+\sigma)} & 0 \\ \frac{1}{C} & \frac{(-1)}{C} & 0 & 0 & \frac{1}{C} \end{pmatrix} \begin{pmatrix} 0 \\ 0 \\ 2 \\ 1 \\ 0 \end{pmatrix} \frac{3(1-\sigma)}{C^2(1+\sigma)^2} = \begin{pmatrix} (-\sigma) \\ \sigma \\ (2+\sigma) \\ (-2-\sigma) \\ 0 \end{pmatrix} \frac{3(1-\sigma)}{C^2(1+\sigma)^3}$$

With the result of $\begin{pmatrix} a' \\ b' \\ c' \\ d' \\ \varphi_3' \end{pmatrix}$, $\begin{pmatrix} a'' \\ b'' \\ c'' \\ d'' \\ \varphi_3'' \end{pmatrix}$ and $\begin{pmatrix} a''' \\ b''' \\ c''' \\ d''' \\ \varphi_3''' \end{pmatrix}$ taking note of that 1①: $a'+b'=0$ and 2①: $c'+d'=0$ then $a'^2-b'^2=(a'+b')(a'-b')=0$ , $c'^2-d'^2=(c'+d')(c'-d')=0$ , $(a'^3+b'^3)=(a'+b')(a'^2-a'b'+b'^2)=0$ , $(c'^3+d'^3)=(c'+d')(c'^2-c'd'+d'^2)=0$ etc we can find out

1④: $a''''+b''''=\frac{6}{C}\left(a''^2+b''^2\right)+\frac{8}{C}\left(a'a'''+b'b'''\right)-\frac{36}{C^2}\left(a'^2a''+b'^2b''\right)+\frac{24}{C^3}(a'^4+b'^4)$

$$=\frac{6}{C}\left[\sigma^4+\sigma^4\right]\frac{2^2}{C^2(1+\sigma)^4}+\frac{8}{C}\left[(-\sigma)(-\sigma)+\sigma\sigma\right]\frac{3(1-\sigma)}{C^2(1+\sigma)^4}$$

$$-\frac{36}{C^2}\left[(-\sigma)^2\sigma^2+\sigma^2\sigma^2\right]\frac{2}{C(1+\sigma)^4}+\frac{24}{C^3}\left[(-\sigma)^4+\sigma^4\right]\frac{1}{(1+\sigma)^4}$$

$$=\frac{6}{C}\left[2\sigma^4\right]\frac{2^2}{C^2(1+\sigma)^4}+\frac{8}{C}\left[2\sigma^2\right]\frac{3(1-\sigma)}{C^2(1+\sigma)^4}-\frac{36}{C^2}\left[2\sigma^4\right]\frac{2}{C(1+\sigma)^4}+\frac{24}{C^3}\left[2\sigma^4\right]\frac{1}{(1+\sigma)^4}$$

$$=\left[2\sigma^4+2\sigma^2(1-\sigma)-3\cdot 2\sigma^4+2\sigma^4\right]\frac{24}{C^3(1+\sigma)^4}=2\sigma^2\left[-\sigma^2-\sigma+1\right]\frac{24}{C^3(1+\sigma)^4}$$

$$2④\ c''''' + d''''' = \frac{6}{C}\left(c''^2 + d''^2\right) + \frac{8}{C}\left(c'c''' + d'''d'\right) - \frac{36}{C^2}\left(c'^2c'' + d'^2d''\right) + \frac{24}{C^3}\left(c'^4 + d'^4\right)$$

$$= \frac{6}{C}\left[1^2 + 1^2\right]\frac{2^2}{C^2(1+\sigma)^4} + \frac{8}{C}\left[1\cdot(2+\sigma) + (-2-\sigma)(-1)\right]\frac{3(1-\sigma)}{C^2(1+\sigma)^4}$$

$$-\frac{36}{C^2}\left[1^2\cdot 1 + (-1)^2 1\right]\frac{2}{C(1+\sigma)^4} + \frac{24}{C^3}\left[1^4 + (-1)^4\right]\frac{1}{(1+\sigma)^4}$$

$$= \left\{\left[1^2 + 1^2\right] + (1-\sigma)\left[1\cdot(2+\sigma) + (-2-\sigma)(-1)\right] - 3\left[1^2\cdot 1 + (-1)^2 1\right] + \left[1^4 + (-1)^4\right]\right\}\frac{24}{C^3(1+\sigma)^4}$$

$$= \left\{[2] + (1-\sigma)[4+2\sigma] - 3[2] + [2]\right\}\frac{24}{C^3(1+\sigma)^4}$$

$$= \left\{[2] + \left[4 - 2\sigma - 2\sigma^2\right] - 3[2] + [2]\right\}\frac{24}{C^3(1+\sigma)^4} = (2 - 2\sigma - 2\sigma^2)\frac{24}{C^3(1+\sigma)^4}$$

$$3④ - a''''' + b''''' + c''''' - d'''''$$

$$= \frac{4(a'''d' + a'd''') + 6(a''d'' - b''c'') - 4(b'c''' + b'''c') + 4(c''' + d''')}{C}$$

$$= \frac{4}{C}\left[(-\sigma)(-1) + (-\sigma)(-2-\sigma)\right]\frac{3(1-\sigma)}{C^2(1+\sigma)^4} + \frac{6}{C}\left[\sigma^2 1 - \sigma^2 1\right]\frac{2^2}{C^2(1+\sigma)^4}$$

$$-\frac{4}{C}\left[\sigma(2+\sigma) + \sigma 1\right]\frac{3(1-\sigma)}{C^2(1+\sigma)^4} + \frac{4}{C}\left[(2+\sigma) + (-2-\sigma)\right]\frac{3(1-\sigma)}{C^2(1+\sigma)^3}$$

=0

$$4④\ \frac{1}{\sigma}a''''' - \frac{1}{\sigma}b''''' + c''''' - d_3''''' = 3(d'' - c'')\varphi_3'' + 2(d' - c')\varphi''' = 0+0=0$$

$$5④: - a''''' - b''''' + c''''' + d''''' + \varphi_3''''' \left(2C\right) =$$

$$= 6\frac{2(\sigma-1)}{C^2(1+\sigma)}\left\{[-1-1]\frac{2}{C(1+\sigma)^2} + \frac{8}{C}[(-\sigma)\sigma]\frac{1}{(1+\sigma)^2} + \right.$$

$$\left.\frac{2}{C}\left[-(-\sigma)1 + (-\sigma)(-1) + \sigma 1 - \sigma(-1)\right]\frac{1}{(1+\sigma)^2}\right\} + \frac{8}{C}\left[-(-\sigma)(-\sigma) + (-\sigma)\sigma + (-\sigma)\sigma\right.$$

$$\left. -\sigma\sigma + 1\cdot(2+\sigma) - 1(-2-\sigma) - (2+\sigma)(-1) + (-1)(-2-\sigma)\right]\frac{3(1-\sigma)}{C^2(1+\sigma)^4}$$

$$+\frac{6}{C}\left[-\sigma^4 - \sigma^4 + 1^2 + 1^2\right]\frac{2^2}{C^2(1+\sigma)^4} + \frac{12}{C}\left[\sigma^2\sigma^2 - 1\cdot 1\right]\frac{2^2}{C^2(1+\sigma)^4}$$

$$+\frac{12}{C^2}\left[-\sigma^2\sigma^2-(-\sigma)^2\sigma^2+\sigma^2(-1)^2-(-\sigma)^2 1+\sigma^2 1^2-\sigma^2 1+1\cdot(-1)^2+1^2\cdot 1\right.$$

$$+\sigma^2\sigma 1+(-\sigma)\sigma^2 1+(-\sigma)\sigma 1+\sigma^2\sigma(-1)+(-\sigma)\sigma^2(-1)+(-\sigma)\sigma 1$$

$$\left.-\sigma^2 1(-1)-(-\sigma)1(-1)-(-\sigma)1\cdot 1-\sigma^2 1(-1)-\sigma 1(-1)-\sigma 1\cdot 1\right]\frac{2}{C(1+\sigma)^4}$$

$$+\frac{24}{C^2}\left[-(-\sigma)\sigma^2\sigma-(-\sigma)\sigma^2(-1)-(-\sigma)\sigma\sigma^2+(-\sigma)(-1)1-\sigma\sigma^2 1+\sigma 1\cdot 1+1\cdot 1(-1)\right.$$

$$\left.+1(-1)1\right]\frac{2}{C(1+\sigma)^4}+\frac{36}{C^2}\left[(-\sigma)^2\sigma^2+\sigma^2\sigma^2-1^2\cdot 1-(-1)^2 1\right]\frac{2}{C(1+\sigma)^4}+$$

$$\frac{24}{C^3}\left[-(-\sigma)\sigma^2 1-(-\sigma)^2\sigma(-1)+(-\sigma)1(-1)^2+\sigma 1^2(-1)+(-\sigma)\sigma^3+(-\sigma)^3\sigma+(-\sigma)^3(-1)\right.$$

$$\left.-(-\sigma)(-1)^3+\sigma^3 1-\sigma 1^3-1(-1)^3-1^3(-1)-(-\sigma)^4-\sigma^4+1^4+(-1)^4\right]\frac{1}{(1+\sigma)^4}$$

$$+4\left\{\frac{2}{C}\left[-(-\sigma)+\sigma-(2+\sigma)+(-2-\sigma)\right]\frac{3(1-\sigma)}{C^2(1+\sigma)^3}+\frac{6}{C^2}\left[(-\sigma)\sigma^2-\sigma\sigma^2+1\cdot 1\right.\right.$$

$$\left.-(-1)1\right]\frac{2}{C(1+\sigma)^3}+\frac{12}{C^3}\left[(-\sigma)\sigma 1-(-\sigma)\sigma(-1)+(-\sigma)1(-1)-\sigma 1(-1)\right]\frac{1}{(1+\sigma)^3}$$

$$+\frac{6}{C^3}\left[(-\sigma)^2\sigma-(-\sigma)\sigma^2-(-\sigma)^2 1-(-\sigma)1^2+(-\sigma)^2(-1)-(-\sigma)(-1)^2-\sigma^2 1+\sigma 1^2\right.$$

$$\left.\left.+\sigma^2(-1)+\sigma(-1)^2+1^2(-1)-1(-1)^2-(-\sigma)^3+\sigma^3-1^3+(-1)^3\right]\frac{1}{(1+\sigma)^3}\right\}$$

$$=6\frac{2(\sigma-1)}{C^2(1+\sigma)}\left\{[-2]\frac{2}{C(1+\sigma)^2}+\frac{8}{C}\left[-\sigma^2\right]\frac{1}{(1+\sigma)^2}+\frac{2}{C}[+4\sigma]\frac{1}{(1+\sigma)^2}\right\}$$

$$+\frac{8}{C}\left[-4\sigma^2+4\sigma+8\right]\frac{3(1-\sigma)}{C^2(1+\sigma)^4}+\frac{6}{C}\left[-2\sigma^4+2\right]\frac{2^2}{C^2(1+\sigma)^4}+\frac{12}{C}\left[\sigma^4-1\right]\frac{2^2}{C^2(1+\sigma)^4}$$

$$+\frac{12}{C^2}\left[-2\sigma^4+2\right]\frac{2}{C(1+\sigma)^4}+\frac{24}{C^2}\left[2\sigma^4-2\sigma^3+2\sigma-2\right]\frac{2}{C(1+\sigma)^4}$$

$$+\frac{36}{C^2}\left[2\sigma^4-2\right]\frac{2}{C(1+\sigma)^4}+\frac{24}{C^3}\left[-4\sigma^4+4\sigma^3-4\sigma+4\right]\frac{1}{(1+\sigma)^4}$$

$$+4\left\{\frac{2}{C}[-4]\frac{3(1-\sigma)}{C^2(1+\sigma)^3}+\frac{6}{C^2}\left[-2\sigma^3+2\right]\frac{2}{C(1+\sigma)^3}\right.$$

$$\left.+\frac{12}{C^3}\left[-2\sigma^2+2\sigma\right]\frac{1}{(1+\sigma)^3}+\frac{6}{C^3}\left[4\sigma^3-4\sigma^2+4\sigma-4\right]\frac{1}{(1+\sigma)^3}\right\}$$

$$= 6\frac{2(\sigma-1)}{C^2(1+\sigma)}\left\{\left[-1-2\sigma^2+2\sigma\right]\frac{4}{C(1+\sigma)^2}\right\}+\frac{8}{C}\left[-4\sigma^2+4\sigma+8\right]\frac{3(1-\sigma)}{C^2(1+\sigma)^4}$$

$$+\frac{6}{C}\left[-2\sigma^4+2\right]\frac{2^2}{C^2(1+\sigma)^4}+\frac{12}{C}\left[\sigma^4-1\right]\frac{2^2}{C^2(1+\sigma)^4}+\frac{12}{C^2}\left[-2\sigma^4+2\right]\frac{2}{C(1+\sigma)^4}$$

$$+\frac{24}{C^2}\left[2\sigma^4-2\sigma^3+2\sigma-2\right]\frac{2}{C(1+\sigma)^4}$$

$$+\frac{36}{C^2}\left[2\sigma^4-2\right]\frac{2}{C(1+\sigma)^4}+\frac{24}{C^3}\left[-4\sigma^4+4\sigma^3-4\sigma+4\right]\frac{1}{(1+\sigma)^4}$$

$$+4\left\{\left[-(1-\sigma)+(-\sigma^3+1)+(-\sigma^2+\sigma)+(\sigma^3-\sigma^2+\sigma-1)\right]\frac{24}{C^3(1+\sigma)^3}\right\}$$

$$=2(\sigma-1)\left\{\left[-1-2\sigma^2+2\sigma\right]\frac{24}{C^3(1+\sigma)^3}\right\}+4\left\{\left[-2\sigma^2+3\sigma-1\right]\frac{24}{C^3(1+\sigma)^3}\right\}$$

$$+(1-\sigma)\left[-4\sigma^2+4\sigma+8\right]\frac{24}{C^3(1+\sigma)^4}+\left[-2\sigma^4+2\right]\frac{24}{C^3(1+\sigma)^4}+2\left[\sigma^4-1\right]\frac{24}{C^3(1+\sigma)^4}$$

$$+\left[-2\sigma^4+2\right]\frac{24}{C^3(1+\sigma)^4}+2\left[2\sigma^4-2\sigma^3+2\sigma-2\right]\frac{24}{C^3(1+\sigma)^4}$$

$$+3\left[2\sigma^4-2\right]\frac{24}{C^3(1+\sigma)^4}+\left[-4\sigma^4+4\sigma^3-4\sigma+4\right]\frac{24}{C^3(1+\sigma)^4}$$

$$=\left\{\left[2(\sigma-1)(-1-2\sigma^2+2\sigma)+4(-2\sigma^2+3\sigma-1)\right]\frac{24}{C^3(1+\sigma)^3}\right\}$$

$$+\Big[\ (1-\sigma)(-4\sigma^2+4\sigma+8)+(-2\sigma^4+2)+(2\sigma^4-2)+(-2\sigma^4+2)+$$

$$2(2\sigma^4-2\sigma^3+2\sigma-2)+3(2\sigma^4-2)+(-4\sigma^4+4\sigma^3-4\sigma+4)\ \Big]\frac{24}{C^3(1+\sigma)^4}$$

$$=\left\{\left[(-4\sigma^3+8\sigma^2-6\sigma+2)+(-8\sigma^2+12\sigma-4)\right]\frac{24}{C^3(1+\sigma)^3}\right\}$$

$$+\Big[\ (+4\sigma^3-8\sigma^2-4\sigma+8)+(-2\sigma^4+2)+(2\sigma^4-2)+(-2\sigma^4+2)+$$

$$(4\sigma^4-4\sigma^3+4\sigma-4)+(6\sigma^4-6)+(-4\sigma^4+4\sigma^3-4\sigma+4)\ \Big]\frac{24}{C^3(1+\sigma)^4}$$

$$=\left\{\left[-4\sigma^3+6\sigma-2\right]\frac{24}{C^3(1+\sigma)^3}\right\}+\Big[\ (4\sigma^4+4\sigma^3-8\sigma^2-4\sigma+4)\ \Big]\frac{24}{C^3(1+\sigma)^4}$$

$$=\left\{\left[(-4\sigma^3+6\sigma-2)(1+\sigma)+(4\sigma^4+4\sigma^3-8\sigma^2-4\sigma+4)\right]\frac{24}{C^3(1+\sigma)^4}\right\}$$

$$=\left\{\left[(-4\sigma^4-4\sigma^3+6\sigma^2+4\sigma-2)+(4\sigma^4+4\sigma^3-8\sigma^2-4\sigma+4)\right]\frac{24}{C^3(1+\sigma)^4}\right\}$$

$$=\left\{\left[(-2\sigma^2+2)\right]\frac{24}{C^3(1+\sigma)^4}\right\}$$

Then the 4th five simultaneous equations 1④ 2④ 3④ 4④ 5④ is

$$\begin{pmatrix} 1 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 1 & 0 \\ (-1) & 1 & 1 & (-1) & 0 \\ \frac{1}{\sigma} & \frac{(-1)}{\sigma} & 1 & (-1) & 0 \\ (-1) & (-1) & 1 & 1 & 2C \end{pmatrix}\begin{pmatrix} a'''' \\ b'''' \\ c'''' \\ d'''' \\ \varphi_3'''' \end{pmatrix}=\begin{pmatrix} 2\sigma^2(1-\sigma-\sigma^2) \\ 2(1-\sigma-\sigma^2) \\ 0 \\ 0 \\ (2-2\sigma^2) \end{pmatrix}\frac{24}{C^3(1+\sigma)^4}$$

Then we get

$$\begin{pmatrix} a'''' \\ b'''' \\ c'''' \\ d'''' \\ \varphi_3'''' \end{pmatrix}=\begin{pmatrix} 1 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 1 & 0 \\ (-1) & 1 & 1 & (-1) & 0 \\ \frac{1}{\sigma} & \frac{(-1)}{\sigma} & 1 & (-1) & 0 \\ (-1) & (-1) & 1 & 1 & 2C \end{pmatrix}^{-1}\begin{pmatrix} 2\sigma^2(1-\sigma-\sigma^2) \\ 2(1-\sigma-\sigma^2) \\ 0 \\ 0 \\ (2-2\sigma^2) \end{pmatrix}\frac{24}{C^3(1+\sigma)^4}$$

$$=\begin{pmatrix} 1 & 0 & \frac{(-1)\sigma}{(1+\sigma)} & \frac{\sigma}{(1+\sigma)} & 0 \\ 1 & 0 & \frac{\sigma}{(1+\sigma)} & \frac{(-1)\sigma}{(1+\sigma)} & 0 \\ 0 & 1 & \frac{1}{(1+\sigma)} & \frac{\sigma}{(1+\sigma)} & 0 \\ 0 & 1 & \frac{(-1)}{(1+\sigma)} & \frac{(-1)\sigma}{(1+\sigma)} & 0 \\ \frac{1}{C} & \frac{(-1)}{C} & 0 & 0 & \frac{1}{C} \end{pmatrix}\frac{1}{2}\begin{pmatrix} 2\sigma^2(1-\sigma-\sigma^2) \\ 2(1-\sigma-\sigma^2) \\ 0 \\ 0 \\ (2-2\sigma^2) \end{pmatrix}\frac{24}{C^3(1+\sigma)^4}$$

$$=\begin{pmatrix} 1 & 0 & \frac{(-1)\sigma}{(1+\sigma)} & \frac{\sigma}{(1+\sigma)} & 0 \\ 1 & 0 & \frac{\sigma}{(1+\sigma)} & \frac{(-1)\sigma}{(1+\sigma)} & 0 \\ 0 & 1 & \frac{1}{(1+\sigma)} & \frac{\sigma}{(1+\sigma)} & 0 \\ 0 & 1 & \frac{(-1)}{(1+\sigma)} & \frac{(-1)\sigma}{(1+\sigma)} & 0 \\ \frac{1}{C} & \frac{(-1)}{C} & 0 & 0 & \frac{1}{C} \end{pmatrix}\begin{pmatrix} \sigma^2(1-\sigma-\sigma^2) \\ (1-\sigma-\sigma^2) \\ 0 \\ 0 \\ (1-\sigma^2) \end{pmatrix}\frac{24}{C^3(1+\sigma)^4}$$

$$=\begin{pmatrix} \sigma^2(1-\sigma-\sigma^2) \\ \sigma^2(1-\sigma-\sigma^2) \\ (1-\sigma-\sigma^2) \\ (1-\sigma-\sigma^2) \\ \frac{\sigma(1+\sigma-\sigma^2-\sigma^3)}{C} \end{pmatrix} \frac{24}{C^3(1+\sigma)^4}$$

With the result of $\begin{pmatrix} a' \\ b' \\ c' \\ d' \\ \varphi_3' \end{pmatrix}, \begin{pmatrix} a'' \\ b'' \\ c'' \\ d'' \\ \varphi_3'' \end{pmatrix}, \begin{pmatrix} a''' \\ b''' \\ c''' \\ d''' \\ \varphi_3''' \end{pmatrix}, \begin{pmatrix} a'''' \\ b'''' \\ c'''' \\ d'''' \\ \varphi_3'''' \end{pmatrix}$ and taking note of that 1①: $a'+b'=0$ and 2①: $c'+d'=0$ then $a'^2-b'^2=(a'+b')(a'-b')=0$ , $c'^2-d'^2=(c'+d')(c'-d')=0$ , $(a'^3+b'^3)=(a'+b')(a'^2-a'b'+b'^2)=0$ , $(c'^3+d'^3)=(c'+d')(c'^2-c'd'+d'^2)=0$ etc we can find out

1⑤

$$\frac{a'''''}{a^2}+\frac{b'''''}{b^2}=+10\frac{a'a''''}{a^3}+20\frac{a''a'''}{a^3}-45\cdot 2\frac{a'a''^2}{a^4}-60\frac{a'^2a'''}{a^4}+60\cdot 4\frac{a'^3a''}{a^5}-24\cdot 5\frac{a'^5}{a^6}$$

$$+10\frac{b'b''''}{b^3}+20\frac{b''b'''}{b^3}-45\cdot 2\frac{b'b''^2}{b^4}-60\frac{b'^2b'''}{b^4}+60\cdot 4\frac{b'^3b''}{b^5}-24\cdot 5\frac{b'^5}{b^6}$$

$$=+10\frac{a'a''''}{a^3}+10\frac{b'b''''}{b^3}+20\frac{a''a'''}{a^3}+20\frac{b''b'''}{b^3}-60\frac{a'^2a'''}{a^4}-60\frac{b'^2b'''}{b^4}-45\cdot 2\frac{a'a''^2}{a^4}-45\cdot 2\frac{b'b''^2}{b^4}$$

$$+60\cdot 4\frac{a'^3a''}{a^5}+60\cdot 4\frac{b'^3b''}{b^5}-24\cdot 5\frac{a'^5}{a^6}-24\cdot 5\frac{b'^5}{b^6}$$

$$=+\frac{10}{C^3}\left[(-\sigma)\sigma^2(1-\sigma-\sigma^2)+\sigma\sigma^2(1-\sigma-\sigma^2)\right]\frac{24}{C^3(1+\sigma)^5}+\frac{20}{C^3}\left[\sigma^2(-\sigma)+\sigma^2\sigma\right]\frac{6(1-\sigma)}{C^3(1+\sigma)^5}$$

$$-\frac{60}{C^4}\left[(-\sigma)^2(-\sigma)+\sigma^2\sigma\right]\frac{3(1-\sigma)}{C^2(1+\sigma)^5}-\frac{45\cdot 2}{C^4}\left[(-\sigma)\sigma^4+\sigma\sigma^4\right]\frac{4}{C^2(1+\sigma)^5}$$

$$+\frac{60\cdot 4}{C^5}\left[(-\sigma)^3\sigma^2+\sigma^3\sigma^2\right]\frac{2}{C(1+\sigma)^5}-\frac{24\cdot 5}{C^6}\left[(-\sigma)^5+\sigma^5\right]$$

=0

2⑤:

$$\frac{c'''''}{c^2}+\frac{d'''''}{d^2}=+10\frac{c'c''''}{c^3}+20\frac{c''c'''}{c^3}-60\frac{c'^2c'''}{c^4}-45\cdot 2\frac{c'c''^2}{c^4}+60\cdot 4\frac{c'^3c''}{c^5}-24\cdot 5\frac{c'^5}{c^6}$$

$$+10\frac{d'd''''}{d^3}+20\frac{d'''d''}{d^3}-60\frac{d'''d'^2}{d^4}-45\cdot 2\frac{d'd''^2}{d^4}+60\cdot 4\frac{d'^3d''}{d^5}-24\cdot 5\frac{d'^5}{d^6}$$

$$= +10\frac{c'c''''}{c^3} + 10\frac{d'd''''}{d^3} + 20\frac{c''c'''}{c^3} + 20\frac{d'''d''}{d^3} - 60\frac{c'^2c'''}{c^4} - 60\frac{d'''d'^2}{d^4}$$

$$- 45\cdot 2\frac{c'c''^2}{c^4} - 45\cdot 2\frac{d'd''^2}{d^4} + 60\cdot 4\frac{c'^3c''}{c^5} + 60\cdot 4\frac{d'^3d''}{d^5} - 24\cdot 5\frac{c'^5}{c^6} - 24\cdot 5\frac{d'^5}{d^6}$$

$$= +\frac{10}{C^3}\left[1\cdot(1-\sigma-\sigma^2) + (-1)(1-\sigma-\sigma^2)\right]\frac{24}{C^3(1+\sigma)^5} + \frac{20}{C^3}\left[1(2+\sigma) + (-2-\sigma)1\right]\frac{6(1-\sigma)}{C^3(1+\sigma)^5}$$

$$- \frac{60}{C^4}\left[1^2(2+\sigma) + (-2-\sigma)(-1)^2\right]\frac{3(1-\sigma)}{C^2(1+\sigma)^5} - \frac{45\cdot 2}{C^4}\left[1\cdot 1^2 + (-1)1^2\right]\frac{4}{C^2(1+\sigma)^5} \qquad =0$$

$$+ \frac{60\cdot 4}{C^5}\left[1^3\cdot 1 + (-1)^3\cdot 1\right]\frac{2}{C(1+\sigma)^5} - \frac{24\cdot 5}{C^6}\left[1^5 + (-1)^5\right]\frac{1}{(1+\sigma)^5}$$

3⑤:

$$- a''''' + b''''' + c''''' - d'''''$$

$$= \frac{5}{C}\left[+ a'd'''' + a''''d' - b''''c' - b'c'''' - 2b'''c'' - 2b''c''' + 2a'''d'' + 2a''d''' + (c'''' + d'''')\right]$$

$$= \frac{5}{C}\left\{\left[(-\sigma)1 + \sigma^2(-1) - \sigma^2 1 - \sigma\right](1-\sigma-\sigma^2)\frac{24}{C^3(1+\sigma)^5}\right.$$

$$\left. + 2\left[-\sigma 1 - \sigma^2(2+\sigma) + (-\sigma)1 + \sigma^2(-2-\sigma)\right]\frac{6(1-\sigma)}{C^3(1+\sigma)^5} + (1+1)(1-\sigma-\sigma^2)\frac{24}{C^3(1+\sigma)^4}\right\}$$

$$= \frac{5}{C}\left\{\left[-2\sigma^2 - 2\sigma\right](1-\sigma-\sigma^2)\frac{24}{C^3(1+\sigma)^5}\right.$$

$$\left. + 2\left[-2\sigma^2(2+\sigma) - 2\sigma\right]\frac{6(1-\sigma)}{C^3(1+\sigma)^5} + 2(1-\sigma-\sigma^2)\frac{24}{C^3(1+\sigma)^4}\right\}$$

$$= \frac{5}{C}\left\{\left[(-\sigma^2 - \sigma + 1 + \sigma)2(1-\sigma-\sigma^2)\right] + \left[-\sigma^2(2+\sigma) - \sigma\right](1-\sigma)\right\}\frac{24}{C^3(1+\sigma)^5}$$

$$= \frac{5}{C}\left\{\left[(1+\sigma)2(1-\sigma-\sigma^2)\right] + \left[-\sigma^2(2+\sigma) - \sigma\right]\right\}(1-\sigma)\frac{24}{C^3(1+\sigma)^5}$$

$$= \frac{5}{C}(2 - \sigma - 6\sigma^2 - 3\sigma^3)(1-\sigma)\frac{24}{C^3(1+\sigma)^5}$$

4⑤:

$$(c''''' - d''''')\sqrt{\varphi_3} + 5(c'''' - d'''')\frac{\varphi_3'}{2\sqrt{\varphi_3}} + 10(c''' - d''')\left[\frac{\varphi_3''}{2\sqrt{\varphi_3}} + \frac{\varphi_3'^2}{2(\sqrt{\varphi_3})^3}\frac{(-1)}{2}\right]$$

$$+10(c'' - d'')\left[\frac{\varphi_3'''}{2\sqrt{\varphi_3}} - \frac{3\varphi_3''\varphi_3'}{4(\sqrt{\varphi_3})^3} + \frac{3\varphi_3'^3}{8\left(\sqrt{\varphi_3}\right)^5}\right]$$

$$+5(c' - d')\left[\frac{\varphi_3''''}{2\sqrt{\varphi_3}} - \frac{\varphi_3'''\varphi_3'}{(\sqrt{\varphi_3})^3} - \frac{3\varphi_3''^2}{4(\sqrt{\varphi_3})^3} + \frac{9\varphi_3'^2\varphi_3''}{4\left(\sqrt{\varphi_3}\right)^5} + \frac{3\varphi_3'^4}{8\left(\sqrt{\varphi_3}\right)^7}\frac{(-5)}{2}\right]$$

$$+(c - d)\left[\frac{\varphi_3'''''}{2\sqrt{\varphi_3}} - \frac{5\varphi_3'\varphi_3''''}{4(\sqrt{\varphi_3})^3} - \frac{10\varphi_3''\varphi_3'''}{4(\sqrt{\varphi_3})^3} + \frac{15\varphi_3'''\varphi_3'^2}{4(\sqrt{\varphi_3})^5} + \frac{27\varphi_3'\varphi_3''^2}{8\left(\sqrt{\varphi_3}\right)^5} - \frac{15\cdot 5\varphi_3'^3\varphi_3''}{8\left(\sqrt{\varphi_3}\right)^7} + \frac{15\cdot 7\varphi_3'^5}{32\left(\sqrt{\varphi_3}\right)^7}\right]$$

$$= \frac{1}{\sigma}(b''''' - a''''')$$

i.e.

$$(c''''' - d''''') + 0 + 10(c''' - d''')\frac{\varphi_3''}{2} + 0 + 5(c' - d')\left[\frac{\varphi_3''''}{2} - \frac{3\varphi_3''^2}{4}\right] + 0 = \frac{1}{\sigma}(b''''' - a''''')$$

i.e.

$$-\frac{1}{\sigma}(b''''' - a''''') + c''''' - d''''' = -10(c''' - d''')\frac{\varphi_3''}{2} - 5(c' - d')\left[\frac{\varphi_3''''}{2} - \frac{3\varphi_3''^2}{4}\right]$$

$$= -10\frac{3(1-\sigma)}{C^2(1+\sigma)^3}\left[(2+\sigma) - (-2-\sigma))\right]\frac{(\sigma - 1)}{C^2(1+\sigma)}$$

$$-5\frac{1}{(1+\sigma)}\left[1 - (-1)\right]\left[\frac{12\sigma(1+\sigma-\sigma^2-\sigma^3)}{C^4(1+\sigma)^4} - \frac{3}{4}\frac{2^2(\sigma-1)^2}{C^4(1+\sigma)^2}\right]$$

$$= \frac{30(1-\sigma)^2}{C^4(1+\sigma)^4}2(2+\sigma) - \frac{10}{(1+\sigma)}\left[\frac{12\sigma[(1+\sigma) - \sigma^2(1+\sigma)]}{C^4(1+\sigma)^4} - \frac{3(\sigma-1)^2}{C^4(1+\sigma)^2}\right]$$

$$= \frac{30(1-\sigma)^2}{C^4(1+\sigma)^4}2(2+\sigma) - \frac{10}{(1+\sigma)}\left[\frac{12\sigma(1-\sigma^2)}{C^4(1+\sigma)^3} - \frac{3(\sigma-1)^2}{C^4(1+\sigma)^2}\right]$$

$$= \frac{30(1-\sigma)^2}{C^4(1+\sigma)^4}2(2+\sigma) - \frac{10}{(1+\sigma)}\left[\frac{(-15\sigma^2 + 18\sigma - 3)}{C^4(1+\sigma)^2}\right]$$

$$= \frac{30(1-\sigma)^2}{C^4(1+\sigma)^4}2(2+\sigma) - \frac{10}{(1+\sigma)}\left[\frac{(5\sigma-1)(-3\sigma+3)}{C^4(1+\sigma)^2}\right]$$

$$= \frac{30(1-\sigma)}{C^4(1+\sigma)^4}\left[2(2+\sigma)(1-\sigma)\right] - \frac{30(1-\sigma)}{C^4(1+\sigma)^4}(5\sigma-1)(1+\sigma)$$

$$= \frac{30(1-\sigma)}{C^4(1+\sigma)^4}\left[2(2+\sigma)(1-\sigma) - (5\sigma-1)(1+\sigma)\right]$$

$$= \frac{30(1-\sigma)}{C^4(1+\sigma)^4}(5-6\sigma-7\sigma^2)$$

5⑤ becomes

$$-a''''' - b''''' + c''''' + d''''' + \varphi_3^{'''''}(2C) =$$

$$-5\frac{24\sigma(1+\sigma-\sigma^2-\sigma^3)}{C^4(1+\sigma)^4}[1+(-1)]\frac{1}{(1+\sigma)} - 10\frac{2(\sigma-1)}{C^2(1+\sigma)}\left\{[(2+\sigma)+(-2-\sigma)]\frac{3(1-\sigma)}{C^2(1+\sigma)^3}\right.$$

$$+\frac{3}{C}[+\sigma^2 1+(-\sigma)1-(-\sigma)1-\sigma^2(-1)-\sigma^2 1-\sigma 1+\sigma^2(-1)+\sigma 1]\frac{2}{C(1+\sigma)^3}$$

$$\left.+\frac{6}{C}[(-\sigma)\sigma^2+\sigma\sigma^2-\sigma^2\sigma-(-\sigma)\sigma^2]\frac{2}{C(1+\sigma)^3}+\frac{6}{C^2}[(-\sigma)^2(-1)+\sigma^2 1]\frac{1}{(1+\sigma)^3}\right\}$$

$$+\frac{10}{C}[-(-\sigma)\sigma^2(1-\sigma-\sigma^2)-\sigma\sigma^2(1-\sigma-\sigma^2)+1\cdot(1-\sigma-\sigma^2)+(-1)(1-\sigma-\sigma^2)$$

$$+\sigma^2(1-\sigma-\sigma^2)\sigma+(-\sigma)\sigma^2(1-\sigma-\sigma^2)-1\cdot(1-\sigma-\sigma^2)-(1-\sigma-\sigma^2)(-1)]\frac{24}{C^3(1+\sigma)^5}$$

$$+\frac{20}{C}[-\sigma^2(-\sigma)+(-\sigma)\sigma^2+\sigma^2\sigma-\sigma^2\sigma+1(2+\sigma)-1(-2-\sigma)-(2+\sigma)1$$

$$+1(-2-\sigma)]\frac{6(1-\sigma)}{C^3(1+\sigma)^5}+\frac{20}{C^2}[-(-\sigma)^2\sigma-(-\sigma)\sigma^2+(-\sigma)(-1)^2-(-\sigma)^2(-2-\sigma)$$

$$-\sigma^2(2+\sigma)+\sigma 1^2+(2+\sigma)(-1)^2+1^2(-2-\sigma)]\frac{3(1-\sigma)}{C^2(1+\sigma)^5}+\frac{60}{C^2}[(-\sigma)^2(-\sigma)+\sigma^2\sigma$$

$$-1^2(2+\sigma)-(-1)^2(-2-\sigma)]\frac{3(1-\sigma)}{C^2(1+\sigma)^5}+\frac{40}{C^2}[-(-\sigma)(-\sigma)\sigma-(-\sigma)(-\sigma)(-1)$$

$$-(-\sigma)\sigma\sigma+(-\sigma)(-1)(-2-\sigma)-\sigma\sigma 1+\sigma 1(2+\sigma)+1(2+\sigma)(-1)$$

$$+1(-1)(-2-\sigma)]\frac{3(1-\sigma)}{C^2(1+\sigma)^5}+\frac{20}{C^2}[(-\sigma)\sigma 1+(-\sigma)\sigma 1+(-\sigma)\sigma(2+\sigma)+(-\sigma)\sigma(-1)$$

$$+(-\sigma)\sigma(-1)+(-\sigma)\sigma(-2-\sigma)-(-\sigma)1(-1)-(-\sigma)(2+\sigma)(-1)-(-\sigma)1(-2-\sigma)$$

$$-\sigma 1(-1)-\sigma(2+\sigma)(-1)-\sigma 1(-2-\sigma)]\frac{3(1-\sigma)}{C^2(1+\sigma)^5}+\frac{90}{C^2}[(-\sigma)\sigma^4+\sigma\sigma^4-1\cdot 1^2$$

$$-(-1)1^2]\frac{4}{C^2(1+\sigma)^5}+\frac{60}{C^2}[-(-\sigma)\sigma^2\sigma^2-(-\sigma)\sigma^2 1-\sigma^2\sigma\sigma^2+\sigma^2(-1)1-\sigma\sigma^2 1$$

$$+\sigma^2 1\cdot 1+1\cdot 1\cdot 1+1(-1)1]\frac{4}{C^2(1+\sigma)^5}+\frac{30}{C^2}[-\sigma^4\sigma-(-\sigma)\sigma^4-\sigma^4(-1)+(-\sigma)1^2-\sigma^4 1$$

$$+\sigma 1^2+1^2(-1)+1\cdot 1^2+(-\sigma)\sigma^2 1+\sigma^2\sigma 1+\sigma^2\sigma^2 1+\sigma^2\sigma 1+\sigma^2\sigma^2(-1)+(-\sigma)\sigma^2 1$$

$$-\sigma^2 1\cdot 1-(-\sigma)1\cdot 1-\sigma^2 1(-1)-\sigma^2 1(-1)-\sigma^2 1\cdot 1-\sigma 1\cdot 1]\frac{4}{C^2(1+\sigma)^5}$$

$$+\frac{60}{C^3}\left[-(-\sigma)\sigma^2 1-\sigma^2\sigma^2 1-(-\sigma)^2\sigma^2(-1)-(-\sigma)^2\sigma 1+\sigma^2 1(-1)^2+(-\sigma)1(-1)^2\right.$$
$$+\sigma^2 1^2(-1)+\sigma 1^2 1+\sigma^2\sigma^3+(-\sigma)^3\sigma^2+(-\sigma)^3 1-\sigma^2(-1)^3+\sigma^3 1-\sigma^2 1^3-1(-1)^3$$
$$\left.-1^3 1\right]\frac{2}{C(1+\sigma)^5}+\frac{2\cdot 60}{C^3}\left[-(-\sigma)\sigma^2\sigma(-1)-(-\sigma)\sigma\sigma^2 1+(-\sigma)1(-1)1+\sigma 1\cdot 1(-1)\right]\frac{2}{C(1+\sigma)^5}$$
$$+\frac{3\cdot 60}{C^3}\left[(-\sigma)^2\sigma^2\sigma+(-\sigma)^2\sigma^2(-1)+(-\sigma)\sigma^2\sigma^2-(-\sigma)(-1)^2 1+\sigma^2\sigma^2 1-\sigma 1^2 1-1^2 1(-1)\right.$$
$$\left.-1(-1)^2 1\right]\frac{2}{C(1+\sigma)^5}+\frac{4\cdot 60}{C^3}\left[-(-\sigma)^3\sigma^2-\sigma^3\sigma^2+1^3 1+(-1)^3 1\right]+\frac{2\cdot 60}{C^4}\left[-(-\sigma)^4\sigma\right.$$
$$-(-\sigma)\sigma^4-(-\sigma)^4(-1)+(-\sigma)(-1)^4-\sigma^4 1+\sigma 1^4+1(-1)^4+1^4(-1)+(-\sigma)\sigma^3 1$$
$$\left.+(-\sigma)^3\sigma(-1)-(-\sigma)1(-1)^3-\sigma 1^3(-1)+(-\sigma)^5+\sigma^5-1^5-(-1)^5\right]\frac{1}{(1+\sigma)^5}$$
$$+5\left\{\frac{2}{C}\left[-\sigma^2(1-\sigma-\sigma^2)+\sigma^2(1-\sigma-\sigma^2)-(1-\sigma-\sigma^2)+(1-\sigma-\sigma^2)\right]\frac{24}{C^3(1+\sigma)^4}\right.$$
$$+\frac{8}{C^2}\left[(-\sigma)(-\sigma)-\sigma\sigma+1(2+\sigma)-(-1)(-2-\sigma)\right]\frac{3(1-\sigma)}{C^2(1+\sigma)^4}+\frac{6}{C^2}\left[\sigma^4-\sigma^4+1^2\right.$$
$$\left.-1^2\right]\frac{4}{C^2(1+\sigma)^4}+\frac{36}{C^3}\left[-(-\sigma)^2\sigma^2+\sigma^2\sigma^2-1^2 1+(-1)^2 1\right]\frac{2}{C(1+\sigma)^4}+\frac{12}{C^3}\left[-\sigma^2\sigma^2\right.$$
$$+(-\sigma)^2\sigma^2-(-\sigma)^2 1-\sigma^2 1^2-\sigma^2(-1)^2+(-\sigma)^2 1+\sigma^2 1^2-\sigma^2 1+\sigma^2(-1)^2+\sigma^2 1+1^2 1$$
$$\left.-1(-1)^2\right]\frac{2}{C(1+\sigma)^4}+\frac{24}{C^3}\left[(-\sigma)\sigma^2\sigma-(-\sigma)\sigma^2 1+(-\sigma)\sigma^2(-1)-(-\sigma)\sigma\sigma^2-(-\sigma)1\cdot 1\right.$$
$$-(-\sigma)(-1)1-\sigma\sigma^2 1+\sigma\sigma^2(-1)+\sigma 1\cdot 1+\sigma(-1)1+1\cdot 1(-1)-1(-1)1+\sigma^2\sigma 1+(-\sigma)\sigma^2 1$$
$$+(-\sigma)\sigma 1-\sigma^2\sigma(-1)-(-\sigma)\sigma^2(-1)-(-\sigma)\sigma 1+\sigma^2 1(-1)+(-\sigma)1(-1)+(-\sigma)1\cdot 1$$
$$\left.-\sigma^2 1(-1)-\sigma 1(-1)-\sigma 1\cdot 1\right]\frac{2}{C(1+\sigma)^4}+\frac{24}{C^4}\left[-(-\sigma)^2\sigma 1-(-\sigma)\sigma^2 1-(-\sigma)\sigma 1^2\right.$$
$$+(-\sigma)^2\sigma(-1)+(-\sigma)\sigma^2(-1)+(-\sigma)\sigma(-1)^2-(-\sigma)^2 1(-1)-(-\sigma)1^2(-1)-(-\sigma)1(-1)^2$$
$$+\sigma^2 1(-1)+\sigma 1^2(-1)+\sigma 1(-1)^2+(-\sigma)\sigma^3-(-\sigma)^3\sigma+(-\sigma)1^3+(-\sigma)^3 1+(-\sigma)(-1)^3$$
$$-(-\sigma)^3(-1)-\sigma 1^3+\sigma^3 1-\sigma^3(-1)-\sigma(-1)^3-1^3(-1)+1(-1)^3+(-\sigma)^2 1^2-\sigma^2(-1)^2$$
$$\left.\left.+(-\sigma)^4-\sigma^4+1^4-(-1)^4\right]\frac{1}{(1+\sigma)^4}\right\}$$

$$=-0-10\frac{2(\sigma-1)}{C^2(1+\sigma)}\{0+0+0+0\}+\frac{10}{C}\left[\ 0+0+0-0\ \right]\frac{24}{C^3(1+\sigma)^5}$$

$$+\frac{20}{C}[\ 0+0+0]\frac{6(1-\sigma)}{C^3(1+\sigma)^5}+\frac{20}{C^2}[0-0+0+0]\frac{3(1-\sigma)}{C^2(1+\sigma)^5}+\frac{60}{C^2}[0+0-0]\frac{3(1-\sigma)}{C^2(1+\sigma)^5}$$

$$+\frac{40}{C^2}[0-0+0+0]\frac{3(1-\sigma)}{C^2(1+\sigma)^5}+\frac{20}{C^2}[0+0+0-0-0-0]\frac{3(1-\sigma)}{C^2(1+\sigma)^5}$$

$$+\frac{90}{C^2}[0-0]\frac{4}{C^2(1+\sigma)^5}+\frac{60}{C^2}[0-0+0+0]\frac{4}{C^2(1+\sigma)^5}+\frac{30}{C^2}[0-0+$$

$$+0+0+0+0+0-0-0]\frac{4}{C^2(1+\sigma)^5}$$

$$+\frac{60}{C^3}[0-0+0+0+0+0-0-0]\frac{2}{C(1+\sigma)^5}+\frac{2\cdot 60}{C^3}[0+0]\frac{2}{C(1+\sigma)^5}$$

$$+\frac{3\cdot 60}{C^3}[0+0-0-0]\frac{2}{C(1+\sigma)^5}+\frac{4\cdot 60}{C^3}[0+0]+\frac{2\cdot 60}{C^4}[0$$

$$0+0+0+0+0-0]\frac{1}{(1+\sigma)^5}$$

$$+5\left\{\frac{2}{C}[0+0]\frac{24}{C^3(1+\sigma)^4}+\frac{8}{C^2}[0+0]\frac{3(1-\sigma)}{C^2(1+\sigma)^4}+\frac{6}{C^2}[0+0]\frac{4}{C^2(1+\sigma)^4}\right.$$

$$+\frac{36}{C^3}[0+0]\frac{2}{C(1+\sigma)^4}+\frac{12}{C^3}[0+0+0+0+0-0]\frac{2}{C(1+\sigma)^4}$$

$$+\frac{24}{C^3}[\ 0+0+0-0+0+0+0+0-0+0+0-0]\frac{2}{C(1+\sigma)^4}$$

$$\left.+\frac{24}{C^4}[0+0+0+0-0+0+0+0+00-0+0+0+0+0]\frac{1}{(1+\sigma)^4}\right\}$$

=0

Then the 5th five simultaneous equations 1⑤ 2⑤ 3⑤ 4⑤ 5⑤ is

$$\begin{pmatrix} 1 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 1 & 0 \\ (-1) & 1 & 1 & (-1) & 0 \\ \frac{1}{\sigma} & \frac{(-1)}{\sigma} & 1 & (-1) & 0 \\ (-1) & (-1) & 1 & 1 & 2C \end{pmatrix}\begin{pmatrix} a''''' \\ b''''' \\ c''''' \\ d''''' \\ \varphi_3''''' \end{pmatrix}=\begin{pmatrix} 0 \\ 0 \\ (2-\sigma-6\sigma^2-3\sigma^3)4 \\ (5-6\sigma-7\sigma^2) \\ 0 \end{pmatrix}\frac{30(1-\sigma)}{C^4(1+\sigma)^4}$$

Then we get

$$\begin{pmatrix} a''''' \\ b''''' \\ c''''' \\ d''''' \\ \varphi_3''''' \end{pmatrix}=\begin{pmatrix} 1 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 1 & 0 \\ (-1) & 1 & 1 & (-1) & 0 \\ \frac{1}{\sigma} & \frac{(-1)}{\sigma} & 1 & (-1) & 0 \\ (-1) & (-1) & 1 & 1 & 2C \end{pmatrix}^{-1}\begin{pmatrix} 0 \\ 0 \\ (2-\sigma-6\sigma^2-3\sigma^3)4 \\ (5-6\sigma-7\sigma^2) \\ 0 \end{pmatrix}\frac{30(1-\sigma)}{C^4(1+\sigma)^4}$$

$$=\begin{pmatrix} 1 & 0 & \frac{(-\sigma)}{(1+\sigma)} & \frac{\sigma}{(1+\sigma)} & 0 \\ 1 & 0 & \frac{\sigma}{(1+\sigma)} & \frac{(-\sigma)}{(1+\sigma)} & 0 \\ 0 & 1 & \frac{1}{(1+\sigma)} & \frac{\sigma}{(1+\sigma)} & 0 \\ 0 & 1 & \frac{(-1)}{(1+\sigma)} & \frac{(-\sigma)}{(1+\sigma)} & 0 \\ \frac{1}{C} & \frac{(-1)}{C} & 0 & 0 & \frac{1}{C} \end{pmatrix} \frac{1}{2} \begin{pmatrix} 0 \\ 0 \\ (2-\sigma-6\sigma^2-3\sigma^3)4 \\ (5-6\sigma-7\sigma^2) \\ 0 \end{pmatrix} \frac{30(1-\sigma)}{C^4(1+\sigma)^4}$$

$$=\begin{pmatrix} 1 & 0 & \frac{(-\sigma)}{(1+\sigma)} & \frac{\sigma}{(1+\sigma)} & 0 \\ 1 & 0 & \frac{\sigma}{(1+\sigma)} & \frac{(-\sigma)}{(1+\sigma)} & 0 \\ 0 & 1 & \frac{1}{(1+\sigma)} & \frac{\sigma}{(1+\sigma)} & 0 \\ 0 & 1 & \frac{(-1)}{(1+\sigma)} & \frac{(-\sigma)}{(1+\sigma)} & 0 \\ \frac{1}{C} & \frac{(-1)}{C} & 0 & 0 & \frac{1}{C} \end{pmatrix} \begin{pmatrix} 0 \\ 0 \\ (2-\sigma-6\sigma^2-3\sigma^3)4 \\ (5-6\sigma-7\sigma^2) \\ 0 \end{pmatrix} \frac{15(1-\sigma)}{C^4(1+\sigma)^4}$$

$$=\begin{pmatrix} \sigma(-3-2\sigma+17\sigma^2+12\sigma^3) \\ \sigma(3+2\sigma-17\sigma^2-12\sigma^3) \\ (8+\sigma-30\sigma^2-19\sigma^3) \\ (-8-\sigma+30\sigma^2+19\sigma^3) \\ 0 \end{pmatrix} \frac{15(1-\sigma)}{C^4(1+\sigma)^5}$$

With the result of $\begin{pmatrix} a' \\ b' \\ c' \\ d' \\ \varphi_3' \end{pmatrix}, \begin{pmatrix} a'' \\ b'' \\ c'' \\ d'' \\ \varphi_3'' \end{pmatrix}, \begin{pmatrix} a''' \\ b''' \\ c''' \\ d''' \\ \varphi_3''' \end{pmatrix}, \begin{pmatrix} a'''' \\ b'''' \\ c'''' \\ d'''' \\ \varphi_3'''' \end{pmatrix}, \begin{pmatrix} a''''' \\ b''''' \\ c''''' \\ d''''' \\ \varphi_3''''' \end{pmatrix}$ etc we can find out

1⑥:

$$a'''''' + b'''''' = 12\frac{a'a'''''}{C} + 30\frac{a''a''''}{C} - 90\frac{a'^2a''''}{C^2} + 20\frac{a'''^2}{C} + 60\cdot 8\frac{a'^3a'''}{C^3} - 9\cdot 10\cdot 4\frac{a'a''a'''}{C^2}$$

$$-45\cdot 2\frac{a''^3}{C^2} + 45\cdot 24\frac{a'^2a''^2}{C^3} - 60\cdot 5\cdot 6\frac{a'^4a''}{C^4} + 24\cdot 6\cdot 5\frac{a'^6}{C^5}$$

$$12\frac{b'b'''''}{C} + 30\frac{b''b''''}{C} - 90\frac{b'^2b''''}{C^2} + 20\frac{b'''^2}{C} + 60\cdot 8\frac{b'^3b'''}{C^3} - 9\cdot 10\cdot 4\frac{b'b''b'''}{C^2}$$

$$-45\cdot 2\frac{b''^3}{C^2} + 45\cdot 24\frac{b'^2b''^2}{C^3} - 60\cdot 5\cdot 6\frac{b'^4b''}{C^4} + 24\cdot 6\cdot 5\frac{b'^6}{C^5}$$

$$= 12\frac{a'a'''''}{C} + 12\frac{b'b'''''}{C} + 20\frac{a'''^2}{C} + 20\frac{b'''^2}{C} + 30\frac{a''a''''}{C} + 30\frac{b''b''''}{C} - 90\frac{a'^2a''''}{C^2} - 90\frac{b'^2b''''}{C^2}$$

$$-90\frac{a''^3}{C^2} - 90\frac{b''^3}{C^2} - 360\frac{a'a''a'''}{C^2} - 360\frac{b'b''b'''}{C^2} + 480\frac{a'^3a'''}{C^3} + 480\frac{b'^3b'''}{C^3}$$

$$+1080\frac{a'^2a''^2}{C^3} + 1080\frac{b'^2b''^2}{C^3} - 1800\frac{a'^4a''}{C^4} - 1800\frac{b'^4b''}{C^4} + 720\frac{a'^6}{C^5} + 720\frac{b'^6}{C^5}$$

$$= +\frac{12}{C}\left[(-\sigma)\cdot\sigma(-3-2\sigma+17\sigma^2+12\sigma^3) + \sigma\cdot\sigma(3+2\sigma-17\sigma^2-12\sigma^3)\right]\frac{15(1-\sigma)}{C^4(1+\sigma)^6}$$

$$+\frac{20}{C}\left[(-\sigma)^2+\sigma^2\right]\frac{3^2(1-\sigma)^2}{C^4(1+\sigma)^6} + \frac{30}{C}\left[\sigma^2\cdot\sigma^2(1-\sigma-\sigma^2) + \sigma^2\cdot\sigma^2(1-\sigma-\sigma^2)\right]\frac{48}{C^4(1+\sigma)^6}$$

$$-\frac{90}{C^2}\left[(-\sigma)^2\cdot\sigma^2(1-\sigma-\sigma^2) + \sigma^2\cdot\sigma^2(1-\sigma-\sigma^2)\right]\frac{1^2\cdot 24}{C^3(1+\sigma)^6} - \frac{90}{C^2}\left[(\sigma^2)^3 + (\sigma^2)^3\right]\frac{2^3}{C^3(1+\sigma)^6}$$

$$-\frac{360}{C^2}\left[(-\sigma)\cdot\sigma^2\cdot(-\sigma) + \sigma\cdot\sigma^2\cdot\sigma\right]\frac{6(1-\sigma)}{C^3(1+\sigma)^6} + \frac{480}{C^3}\left[(-\sigma)^3\cdot(-\sigma) + \sigma^3\cdot\sigma\right]\frac{3(1-\sigma)}{C^2(1+\sigma)^6}$$

$$+\frac{1080}{C^3}\left[(-\sigma)^2\cdot(\sigma^2)^2 + \sigma^2\cdot(\sigma^2)^2\right]\frac{1^2\cdot 2^2}{C^2(1+\sigma)^6} - \frac{1800}{C^4}\left[(-\sigma)^4\cdot\sigma^2 + \sigma^4\cdot\sigma^2\right]\frac{1^4\cdot 2}{C(1+\sigma)^6}$$

$$+\frac{720}{C^5}\left[(-\sigma)^6 + \sigma^6\right]\frac{1}{(1+\sigma)^6}$$

$$= +\frac{12}{C}\left[+2\sigma\cdot\sigma(3+2\sigma-17\sigma^2-12\sigma^3)\right]\frac{15(1-\sigma)}{C^4(1+\sigma)^6} + \frac{20}{C}\left[+2\sigma^2\right]\frac{3^2(1-\sigma)^2}{C^4(1+\sigma)^6}$$

$$+\frac{30}{C}\left[+2\sigma^2\cdot\sigma^2(1-\sigma-\sigma^2)\right]\frac{48}{C^4(1+\sigma)^6} - \frac{90}{C^2}\left[+2\sigma^2\cdot\sigma^2(1-\sigma-\sigma^2)\right]\frac{1^2\cdot 24}{C^3(1+\sigma)^6}$$

$$-\frac{90}{C^2}\left[+2(\sigma^2)^3\right]\frac{2^3}{C^3(1+\sigma)^6} - \frac{360}{C^2}\left[+2\sigma\cdot\sigma^2\cdot\sigma\right]\frac{6(1-\sigma)}{C^3(1+\sigma)^6} + \frac{480}{C^3}\left[+2\sigma^3\cdot\sigma\right]\frac{3(1-\sigma)}{C^2(1+\sigma)^6}$$

$$+\frac{1080}{C^3}\left[+2\sigma^2\cdot(\sigma^2)^2\right]\frac{4}{C^2(1+\sigma)^6} - \frac{1800}{C^4}\left[+2\sigma^4\cdot\sigma^2\right]\frac{2}{C(1+\sigma)^6} + \frac{720}{C^5}\left[+2\sigma^6\right]\frac{1}{(1+\sigma)^6}$$

$$=\left[(3+2\sigma-17\sigma^2-12\sigma^3)(1-\sigma)+(1-\sigma)^2+\sigma^2(1-\sigma-\sigma^2)8-\sigma^2(1-\sigma-\sigma^2)12-\sigma^4 4\right.$$

$$\left.-\sigma^2(1-\sigma)12+\sigma^2(1-\sigma)8+\sigma^4 24-\sigma^4 20+\sigma^4 4\right]\frac{360\sigma^2}{C^5(1+\sigma)^6}$$

$$=\left[3-\sigma-19\sigma^2+5\sigma^3+12\sigma^4+(1-\sigma)^2-4\sigma^2(1-\sigma-\sigma^2)-4\sigma^2+4\sigma^3+4\sigma^4\right]\frac{360\sigma^2}{C^5(1+\sigma)^6}$$

$$=(4-3\sigma-26\sigma^2+13\sigma^3+20\sigma^4)\frac{360\sigma^2}{C^5(1+\sigma)^6}$$

2⑥:

$$c'''''' + d'''''' = 12\frac{c'c'''''}{C}+30\frac{c''c''''}{C}-90\frac{c'^2c''''}{C^2}+20\frac{c'''^2}{C}+60\cdot 8\frac{c'^3c'''}{C^3}-90\cdot 4\frac{c'c''c'''}{C^2}$$

$$-45\cdot 2\frac{c''^3}{C^2}+45\cdot 24\frac{c'^2c''^2}{C^3}-60\cdot 30\frac{c'^4c''}{C^4}+24\cdot 30\frac{c'^6}{C^5}$$

$$12\frac{d'd'''''}{C}+30\frac{d''d''''}{C}-90\frac{d'^2d''''}{C^2}+20\frac{d'''^2}{C}+60\cdot 8\frac{d'^3d'''}{C^3}-90\cdot 4\frac{d'd''d'''}{C^2}$$

$$-45\cdot 2\frac{d''^3}{C^2}+45\cdot 24\frac{d'^2d''^2}{C^3}-60\cdot 30\frac{d'^4d''}{C^4}+24\cdot 30\frac{d'^6}{C^5}$$

$$=12\frac{c'c'''''}{C}+12\frac{d'd'''''}{C}+20\frac{c'''^2}{C}+20\frac{d'''^2}{C}+30\frac{c''c''''}{C}+30\frac{d''d''''}{C}$$

$$-90\frac{c'^2c''''}{C^2}-90\frac{d'^2d''''}{C^2}-90\frac{c''^3}{C^2}-90\frac{d''^3}{C^2}-360\frac{c'c''c'''}{C^2}-360\frac{d'd''d'''}{C^2}+480\frac{c'^3c'''}{C^3}+480\frac{d'^3d'''}{C^3}$$

$$+1080\frac{c'^2c''^2}{C^3}+1080\frac{d'^2d''^2}{C^3}-1800\frac{c'^4c''}{C^4}-1800\frac{d'^4d''}{C^4}+720\frac{c'^6}{C^5}+720\frac{d'^6}{C^5}$$

$$=\frac{12}{C}\left[1\cdot(8+\sigma-30\sigma^2-19\sigma^3)+(-1)(-8-\sigma+30\sigma^2+19\sigma^3)\right]\frac{15(1-\sigma)}{C^4(1+\sigma)^6}$$

$$+\frac{20}{C}\left[(2+\sigma)^2+(-2-\sigma)^2\right]\frac{3^2(1-\sigma)^2}{C^4(1+\sigma)^6}+\frac{30}{C}\left[1\cdot(1-\sigma-\sigma^2)+1\cdot(1-\sigma-\sigma^2)\right]\frac{48}{C^4(1+\sigma)^6}$$

$$-\frac{90}{C^2}\left[1^2\cdot(1-\sigma-\sigma^2)+(-1)^2\cdot(1-\sigma-\sigma^2)\right]\frac{1^2\cdot 24}{C^3(1+\sigma)^6}-\frac{90}{C^2}\left[1^3+1^3\right]\frac{2^3}{C^3(1+\sigma)^6}$$

$$-\frac{360}{C^2}\left[1\cdot 1\cdot(2+\sigma)+(-1)1(-2-\sigma)\right]\frac{1\cdot 2\cdot 3(1-\sigma)}{C^3(1+\sigma)^6}+\frac{480}{C^3}\left[1^3\cdot(2+\sigma)+(-1)^3\cdot(-2-\sigma)\right]\frac{1^3\cdot 3(1-\sigma)}{C^2(1+\sigma)^6}$$

$$+\frac{1080}{C^3}\left[1^2\cdot 1^2+(-1)^2\cdot 1^2\right]\frac{1^2\cdot 2^2}{C^2(1+\sigma)^6}-\frac{1800}{C^4}\left[1^4\cdot 1+(-1)^4\cdot 1\right]\frac{1^4\cdot 2}{C(1+\sigma)^6}$$

$$+\frac{720}{C^5}\left[1^6+(-1)^6\right]\frac{1}{(1+\sigma)^6}$$

$$=\frac{12}{C}\left[2(8+\sigma-30\sigma^2-19\sigma^3)\right]\frac{15(1-\sigma)}{C^4(1+\sigma)^6}+\frac{20}{C}\left[2(2+\sigma)^2\right]\frac{3^2(1-\sigma)^2}{C^4(1+\sigma)^6}+\frac{30}{C}\left[2(1-\sigma-\sigma^2)\right]\frac{48}{C^4(1+\sigma)^6}$$

$$-\frac{90}{C^2}\left[2(1-\sigma-\sigma^2)\right]\frac{1^2\cdot 24}{C^3(1+\sigma)^6}-\frac{90}{C^2}[2]\frac{2^3}{C^3(1+\sigma)^6}-\frac{360}{C^2}\left[2(2+\sigma)\right]\frac{1\cdot 2\cdot 3(1-\sigma)}{C^3(1+\sigma)^6}$$

$$+\frac{480}{C^3}\left[2(2+\sigma)\right]\frac{1^3\cdot 3(1-\sigma)}{C^2(1+\sigma)^6}+\frac{1080}{C^3}[2]\frac{1^2\cdot 2^2}{C^2(1+\sigma)^6}-\frac{1800}{C^4}[2]\frac{1^4\cdot 2}{C(1+\sigma)^6}+\frac{720}{C^5}[2]\frac{1}{(1+\sigma)^6}$$

$$=(8+\sigma-30\sigma^2-19\sigma^3)(1-\sigma)\frac{360}{C^5(1+\sigma)^6}+(2+\sigma)^2(1-\sigma)^2\frac{360}{C^5(1+\sigma)^6}+8(1-\sigma-\sigma^2)\frac{360}{C^5(1+\sigma)^6}$$

$$-12(1-\sigma-\sigma^2)\frac{360}{C^5(1+\sigma)^6}-12(2+\sigma)(1-\sigma)\frac{360}{C^5(1+\sigma)^6}$$

$$+8(2+\sigma)(1-\sigma)\frac{360}{C^5(1+\sigma)^6}-4\frac{360}{C^5(1+\sigma)^6}+24\frac{360}{C^5(1+\sigma)^6}-20\frac{360}{C^5(1+\sigma)^6}+4\frac{360}{C^5(1+\sigma)^6}$$

$$=\left[(8+\sigma-30\sigma^2-19\sigma^3)(1-\sigma)+(2+\sigma)^2(1-\sigma)^2+8(1-\sigma-\sigma^2)-12(1-\sigma-\sigma^2)-12(2+\sigma)(1-\sigma)\right.$$

$$\left.+8(2+\sigma)(1-\sigma)-4+24-20+4\right]\frac{360}{C^5(1+\sigma)^6}$$

$$=\left[(8-7\sigma-31\sigma^2+11\sigma^3+19\sigma^4)+(2+\sigma)^2(1-\sigma)^2-4(-\sigma-\sigma^2)-4(2+\sigma)(1-\sigma)+0\right]\frac{360}{C^5(1+\sigma)^6}$$

$$=(4-3\sigma-26\sigma^2+13\sigma^3+20\sigma^4)\frac{360}{C^5(1+\sigma)^6}$$

3⑥:

$$-a'''''' + b'''''' + c'''''' - d'''''' =$$

$$\frac{6(a'''''d'+a'd'''''-b'''''c'-b'c''''')-15(b''''c''+b''c''''-a''d''''-a''''d'')+20(a'''d'''-b'''c''')+6(c'''''+d''''')}{C}$$

$$=\frac{6}{C}\left[a'''''d'+a'd'''''-b'''''c'-b'c'''''\right]-\frac{15}{C}\left[b''''c''+b''c''''-a''d''''-a''''d''\right]$$

$$+\frac{20}{C}\left[a'''d'''-b'''c'''\right]+\frac{6}{C}\left[c'''''+d'''''\right]$$

$$= \frac{6}{C}\Big[\sigma(-3-2\sigma+17\sigma^2+12\sigma^3)\cdot(-1)+(-\sigma)\cdot(-8-\sigma+30\sigma^2+19\sigma^3)$$

$$-\sigma(3+2\sigma-17\sigma^2-12\sigma^3)\cdot 1-\sigma\cdot(8+\sigma-30\sigma^2-19\sigma^3)\Big]\frac{15(1-\sigma)}{C^4(1+\sigma)^6}$$

$$-\frac{15}{C}\Big[\sigma^2(1-\sigma-\sigma^2)\cdot 1+\sigma^2\cdot(1-\sigma-\sigma^2)-\sigma^2\cdot(1-\sigma-\sigma^2)-\sigma^2(1-\sigma-\sigma^2)\cdot 1\Big]\frac{48}{C^4(1+\sigma)^6}$$

$$+\frac{20}{C}\big[(-\sigma)\cdot(-2-\sigma)-\sigma\cdot(2+\sigma)\big]\frac{3^2(1-\sigma)^2}{C^4(1+\sigma)^6}$$

$$+\frac{6}{C}\big[(8+\sigma-30\sigma^2-19\sigma^3)+(-8-\sigma+30\sigma^2+19\sigma^3)\big]\frac{15(1-\sigma)}{C^4(1+\sigma)^5}$$

$$=\frac{6}{C}[0+0]\frac{15(1-\sigma)}{C^4(1+\sigma)^6}-\frac{15}{C}[0+0]\frac{48}{C^4(1+\sigma)^6}+\frac{20}{C}[0]\frac{3^2(1-\sigma)^2}{C^4(1+\sigma)^6}+\frac{6}{C}[0]\frac{15(1-\sigma)}{C^4(1+\sigma)^5}$$

=0

4⑥:. $\frac{1}{\sigma}(-b'''''' + a'''''') + (c'''''' - d'''''') =$

$$-15(c'''' - d'''')\frac{\varphi_3''}{2} - 15(c'' - d'')\left(\frac{\varphi_3''''}{2} - \frac{3\varphi_3''^2}{4}\right) - 6(c' - d')(0-0)$$

$$= -15\Big[(1-\sigma-\sigma^2)-(1-\sigma-\sigma^2)\Big]\frac{24}{C^3(1+\sigma)^4}\frac{\varphi_3''}{2} - 15(1-1)\frac{2}{C(1+\sigma)^2}\left(\frac{\varphi_3''''}{2} - \frac{3\varphi_3''^2}{4}\right) - 0$$

=0

5⑥ becomes

$$-a'''''' - b'''''' + c'''''' + d'''''' + \varphi_3''''''(2C) =$$

$$-15\varphi_3''''\left(c'' + d'' + 2\frac{a'c'}{C} - 2\frac{b'c'}{C} + 2\frac{b'd'}{C} - 2\frac{a'd'}{C} - 8\frac{a'b'}{C}\right)$$

$$-15\varphi_3''\left( + c'''' + d'''' + 4\frac{a'''c'}{C} + 4\frac{a'c'''}{C} - 4\frac{a'b'''}{C} - 4\frac{a'''b'}{C} - 4\frac{b'''c'}{C} - 4\frac{b'c'''}{C} + 4\frac{b'''d'}{C} + 4\frac{b'd'''}{C} \right.$$

$$-4\frac{a'''d'}{C} - 4\frac{a'd'''}{C} - 4\frac{a'''b'}{C} - 4\frac{a'b'''}{C} + 8\frac{a'a'''}{C} + 8\frac{b'b'''}{C}$$

$$-12\frac{a''b''}{C} + 6\frac{a''c''}{C} - 6\frac{a''d''}{C} - 6\frac{b''c''}{C} + 6\frac{b''d''}{C} + 6\frac{a''^2}{C} + 6\frac{b''^2}{C}$$

$$-12\frac{a''b'c'}{C^2} - 12\frac{a'b''c'}{C^2} - 12\frac{a'b'c''}{C^2} + 12\frac{a''b'^2}{C^2} + 12\frac{a'^2b''}{C^2} + 12\frac{b'^2c''}{C^2} + 12\frac{a'^2d''}{C^2}$$

$$-12\frac{a''b'd'}{C^2} - 12\frac{a'b''d'}{C^2} - 12\frac{a'b'd''}{C^2} - 36\frac{a'^2a''}{C^2} - 36\frac{b'^2b''}{C^2} + 24\frac{b'b''c'}{C^2} + 24\frac{a'b'b''}{C^2} + 24\frac{a'a''b'}{C^2} + 24\frac{a'a''d'}{C^2}$$

$$\left. + 24\frac{a'b'^2c'}{C^3} - 24\frac{a'b'^3}{C^3} - 24\frac{b'^3c'}{C^3} + 24\frac{a'^2b'd'}{C^3} - 24\frac{a'^3b'}{C^3} - 24\frac{a'^3d'}{C^3} + 24\frac{a'^4}{C^3} + 24\frac{b'^4}{C^3} \right)$$

$$+\left( +12\frac{a'''''b'}{C} + 12\frac{a'b'''''}{C} - 12\frac{c'd'''''}{C} - 12\frac{c'''''d'}{C} - 12\frac{a'a'''''}{C} - 12\frac{b'b'''''}{C} + 12\frac{c'c'''''}{C} + 12\frac{d'd'''''}{C} \right.$$

$$+30\frac{a''b''''}{C} + 30\frac{a''''b''}{C} - 30\frac{c''''d''}{C} - 30\frac{c''d''''}{C} - 30\frac{a''a''''}{C} - 30\frac{b''b''''}{C} + 30\frac{c''c''''}{C} + 30\frac{d''d''''}{C}$$

$$+30\frac{a''''b'c'}{C^2} + 30\frac{a'b''''c'}{C^2} + 30\frac{a'b'c''''}{C^2} + 30\frac{a''''b'd'}{C^2} + 30\frac{a'b''''d'}{C^2} + 30\frac{a'b'd''''}{C^2}$$

$$-30\frac{a''''c'd'}{C^2} - 30\frac{a'c''''d'}{C^2} - 30\frac{a'c'd''''}{C^2} - 30\frac{b''''c'd'}{C^2} - 30\frac{b'c''''d'}{C^2} - 30\frac{b'c'd''''}{C^2}$$

$$-30\frac{a'^2b''''}{C^2} - 30\frac{a''''b'^2}{C^2} - 30\frac{a'^2d''''}{C^2} + 30\frac{a''''d'^2}{C^2} + 30\frac{b''''c'^2}{C^2} - 30\frac{b'^2c''''}{C^2} + 30\frac{c'^2d''''}{C^2} + 30\frac{c''''d'^2}{C^2}$$

$$-60\frac{a'a''''b'}{C^2} - 60\frac{a'a''''d'}{C^2} - 60\frac{a'b'b''''}{C^2} + 60\frac{a'd'd''''}{C^2} - 60\frac{b'b''''c'}{C^2} + 60\frac{b'c'c''''}{C^2} + 60\frac{c'c''''d'}{C^2} + 60\frac{c'd'd''''}{C^2}$$

$$+90\frac{a'^2a''''}{C^2} + 90\frac{b'^2b''''}{C^2} - 90\frac{c'^2c''''}{C^2} - 90\frac{d'^2d''''}{C^2}$$

$$+40\frac{a'''b'''}{C}-40\frac{c'''d'''}{C}-20\frac{a'''^2}{C}-20\frac{b'''^2}{C}+20\frac{c'''^2}{C}+20\frac{d'''^2}{C}$$

$$+60\frac{a'''b'c''}{C^2}+60\frac{a''b'c'''}{C^2}+60\frac{a'b''c'''}{C^2}+60\frac{a'''b''c'}{C^2}+60\frac{a''b'''c'}{C^2}+60\frac{a'b'''c''}{C^2}$$

$$+60\frac{a'b''d'''}{C^2}+60\frac{a'b'''d''}{C^2}+60\frac{a'''b''d'}{C^2}+60\frac{a'''b'd''}{C^2}+60\frac{a''b'''d'}{C^2}+60\frac{a''b'd'''}{C^2}$$

$$-60\frac{a'c''d'''}{C^2}-60\frac{a'c'''d''}{C^2}-60\frac{a''c'd'''}{C^2}-60\frac{a''c'''d'}{C^2}-60\frac{a'''c''d'}{C^2}-60\frac{a'''c'd''}{C^2}$$

$$-60\frac{b''c'd'''}{C^2}-60\frac{b'''c''d'}{C^2}-60\frac{b'''c'd''}{C^2}-60\frac{b''c'''d'}{C^2}-60\frac{b'c'''d''}{C^2}-60\frac{b'c''d'''}{C^2}$$

$$-120\frac{a'a'''b''}{C^2}-120\frac{a'a''b'''}{C^2}-120\frac{a''a'''b'}{C^2}-120\frac{a''a'''d'}{C^2}-120\frac{a'a''d'''}{C^2}-120\frac{a'a'''d''}{C^2}$$

$$-120\frac{a'''b'b''}{C^2}-120\frac{a'b''b'''}{C^2}-120\frac{a''b'b'''}{C^2}+120\frac{a'''d'd''}{C^2}+120\frac{a''d'd'''}{C^2}+120\frac{a'd''d'''}{C^2}$$

$$-120\frac{b'b'''c''}{C^2}-120\frac{b'b''c'''}{C^2}-120\frac{b''b'''c'}{C^2}+120\frac{b'''c'c''}{C^2}+120\frac{b'c''c'''}{C^2}+120\frac{b''c'c'''}{C^2}$$

$$+120\frac{c'c'''d''}{C^2}+120\frac{c'c''d'''}{C^2}+120\frac{c''c'''d'}{C^2}+120\frac{c'''d'd''}{C^2}+120\frac{c''d'd'''}{C^2}+120\frac{c'd''d'''}{C^2}$$

$$+360\frac{a'a''a'''}{C^2}+360\frac{b'b''b'''}{C^2}-360\frac{c'c''c'''}{C^2}-360\frac{d'd''d'''}{C^2}$$

$$-120\frac{a'''b'^2c'}{C^3}-120\frac{a'b'^2c'''}{C^3}-120\frac{a'^2b'd'''}{C^3}-120\frac{a'^2b'''d'}{C^3}+120\frac{a'''c'd'^2}{C^3}+120\frac{a'c'''d'^2}{C^3}+120\frac{b'c'^2d'''}{C^3}+120\frac{b'''c'^2d'}{C^3}$$

$$+120\frac{a'''b'^3}{C^3}+120\frac{a'^3b'''}{C^3}+120\frac{a'^3d'''}{C^3}-120\frac{a'''d'^3}{C^3}+120\frac{b'^3c'''}{C^3}-120\frac{b'''c'^3}{C^3}-120\frac{c'^3d'''}{C^3}-120\frac{c'''d'^3}{C^3}$$

$$-240\frac{a'a'''b'd'}{C^3}-240\frac{a'b'b'''c'}{C^3}+240\frac{a'c'd'd'''}{C^3}+240\frac{b'c'c'''d'}{C^3}-480\frac{a'^3a'''}{C^3}-480\frac{b'^3b'''}{C^3}+480\frac{c'^3c'''}{C^3}+480\frac{d'^3d'''}{C^3}$$

$$+360\frac{a'^2a'''b'}{C^3}+360\frac{a'^2a'''d'}{C^3}+360\frac{a'b'^2b'''}{C^3}-360\frac{a'd'^2d'''}{C^3}+360\frac{b'^2b'''c'}{C^3}-360\frac{b'c'^2c'''}{C^3}-360\frac{c'^2c'''d'}{C^3}-360\frac{c'd'^2d'''}{C^3}$$

$$+90\frac{a''b''c''}{C^2}+90\frac{a''b''d''}{C^2}-90\frac{a''c''d''}{C^2}-90\frac{b''c''d''}{C^2}-90\frac{a''b''^2}{C^2}-90\frac{a''^2b''}{C^2}+90\frac{a''d''^2}{C^2}-90\frac{a''^2d''}{C^2}$$

$$-90\frac{b''^2c''}{C^2}+90\frac{b''c''^2}{C^2}+90\frac{c''d''^2}{C^2}+90\frac{c''^2d''}{C^2}+90\frac{a''^3}{C^2}+90\frac{b''^3}{C^2}-90\frac{c''^3}{C^2}-90\frac{d''^3}{C^2}$$

$$-180\frac{a'b''^2c'}{C^3}-180\frac{a''b'^2c''}{C^3}-180\frac{a'^2b''d''}{C^3}-180\frac{a''^2b'd'}{C^3}$$

$$+180\frac{a''c''d'^2}{C^3}+180\frac{a'c'd''^2}{C^3}+180\frac{b''c'^2d''}{C^3}+180\frac{b'c''^2d'}{C^3}$$

$$-360\frac{a'a''b'd''}{C^3}-360\frac{a'a''b''d'}{C^3}-360\frac{a'b'b''c''}{C^3}-360\frac{a''b'b''c'}{C^3}$$

$$+360\frac{a'c''d'd''}{C^3}+360\frac{a''c'd'd''}{C^3}+360\frac{b'c'c''d''}{C^3}+360\frac{b''c'c''d'}{C^3}$$

$$+540\frac{a'^2a''b''}{C^3}+540\frac{a'a''^2b'}{C^3}+540\frac{a'a''^2d'}{C^3}+540\frac{a'^2a''d''}{C^3}$$

$$+540\frac{a''b'^2b''}{C^3}+540\frac{a'b'b''^2}{C^3}-540\frac{a'd'd''^2}{C^3}-540\frac{a''d'^2d''}{C^3}$$

$$+540\frac{b'^2b''c''}{C^3}+540\frac{b'b''^2c'}{C^3}-540\frac{b'c'c''^2}{C^3}-540\frac{b''c'^2c''}{C^3}$$

$$-540\frac{c'c''^2d'}{C^3}-540\frac{c'^2c''d''}{C^3}-540\frac{c'd'd''^2}{C^3}-540\frac{c''d'^2d''}{C^3}$$

$$-1080\frac{a'^2a''^2}{C^3}-1080\frac{b'^2b''^2}{C^3}+1080\frac{c'^2c''^2}{C^3}+1080\frac{d'^2d''^2}{C^3}$$

$$-360\frac{a'^4b''}{C^4}-360\frac{a''b'^4}{C^4}-360\frac{a'^4d''}{C^4}+360\frac{a''d'^4}{C^4}-360\frac{b'^4c''}{C^4}+360\frac{b''c'^4}{C^4}+360\frac{c'^4d''}{C^4}+360\frac{c''d'^4}{C^4}$$

$$+360\frac{a''b'^3c'}{C^4}+360\frac{a'b'^3c''}{C^4}+360\frac{a'^3b''d'}{C^4}+360\frac{a'^3b'd''}{C^4}-360\frac{a''c'd'^3}{C^4}-360\frac{a'c''d'^3}{C^4}-360\frac{b'c'^3d''}{C^4}-360\frac{b''c'^3d'}{C^4}$$

$$-1440\frac{a'^3a''b'}{C^4}-1440\frac{a'^3a''d'}{C^4}-1440\frac{a'b'^3b''}{C^4}+1440\frac{a'd'^3d''}{C^4}$$

$$-1440\frac{b'^3b''c'}{C^4}+1440\frac{b'c'^3c''}{C^4}+1440\frac{c'^3c''d'}{C^4}+1440\frac{c'd'^3d''}{C^4}$$

$$+1080\frac{a'^2a''b'd'}{C^4}+1080\frac{a'b'^2b''c'}{C^4}-1080\frac{a'c'd'^2d''}{C^4}-1080\frac{b'c'^2c''d'}{C^4}$$

$$+1800\frac{a'^4a''}{C^4}+1800\frac{b'^4b''}{C^4}-1800\frac{c'^4c''}{C^4}-1800\frac{d'^4d''}{C^4}$$

$$-720\frac{a'b'^4c'}{C^5}-720\frac{a'^4b'd'}{C^5}+720\frac{a'c'd'^4}{C^5}+720\frac{b'c'^4d'}{C^5}+720\frac{a'b'^5}{C^5}+720\frac{a'^5b'}{C^5}-720\frac{a'd'^5}{C^5}$$

$$+720\frac{a'^5d'}{C^5}-720\frac{b'c'^5}{C^5}+720\frac{b'^5c'}{C^5}-720\frac{c'd'^5}{C^5}-720\frac{c'^5d'}{C^5}$$

$$\left.-720\frac{a'^6}{C^5}-720\frac{b'^6}{C^5}+720\frac{c'^6}{C^5}+720\frac{d'^6}{C^5}\right)$$

$$+6\Bigg(-2\frac{a'''''}{C}+2\frac{b'''''}{C}-2\frac{c'''''}{C}+2\frac{d'''''}{C}+10\frac{a'a''''}{C^2}-10\frac{b'b''''}{C^2}+10\frac{c'c''''}{C^2}-10\frac{d'd''''}{C^2}$$

$$+20\frac{a''a'''}{C^2}-20\frac{b''b'''}{C^2}+20\frac{c''c'''}{C^2}-20\frac{d''d'''}{C^2}+20\frac{a'^2b'''}{C^3}-20\frac{a'''b'^2}{C^3}-20\frac{a'''d'^2}{C^3}+20\frac{a'^2d'''}{C^3}$$

$$-20\frac{a'''c'^2}{C^3}-20\frac{a'^2c'''}{C^3}+20\frac{b'''c'^2}{C^3}-20\frac{b'^2c'''}{C^3}+20\frac{b'''d'^2}{C^3}+20\frac{b'^2d'''}{C^3}+20\frac{c'^2d'''}{C^3}-20\frac{c'''d'^2}{C^3}$$

$$+40\frac{a'''b'c'}{C^3}+40\frac{a'b'''c'}{C^3}+40\frac{a'b'c'''}{C^3}-40\frac{a'''b'd'}{C^2}-40\frac{a'b'''d'}{C^3}-40\frac{a'b'd'''}{C^3}$$

$$+40\frac{a'''c'd'}{C^3}+40\frac{a'c'''d'}{C^3}+40\frac{a'c'd'''}{C^3}-40\frac{b'''c'd'}{C^3}-40\frac{b'c'''d'}{C^3}-40\frac{b'c'd'''}{C^3}$$

$$+40\frac{a'a'''b'}{C^3}-40\frac{a'a'''c'}{C^3}+40\frac{a'a'''d'}{C^3}-40\frac{a'b'b'''}{C^3}-40\frac{a'c'c'''}{C^3}-40\frac{a'd'd'''}{C^3}-40\frac{b'b'''c'}{C^3}$$

$$+40\frac{b'b'''d'}{C^3}+40\frac{b'c'c'''}{C^3}+40\frac{b'd'd'''}{C^3}+40\frac{c'c'''d'}{C^3}-40\frac{c'd'd'''}{C^3}$$

$$-60\frac{a'^2a'''}{C^3}+60\frac{b'^2b'''}{C^3}-60\frac{c'^2c'''}{C^3}+60\frac{d'^2d'''}{C^3}$$

$$+30\frac{a''^2b'}{C^3}-30\frac{a'b''^2}{C^3}-30\frac{a''^2c'}{C^3}-30\frac{a'c''^2}{C^3}+30\frac{a''^2d'}{C^3}-30\frac{a'd''^2}{C^3}+30\frac{b'c''^2}{C^3}-30\frac{b''^2c'}{C^3}$$

$$+30\frac{b'd''^2}{C^3}+30\frac{b''^2d'}{C^3}-30\frac{c'd''^2}{C^3}+30\frac{c''^2d'}{C^3}$$

$$+60\frac{a''b''c'}{C^3}+60\frac{a''b'c''}{C^3}+60\frac{a'b''c''}{C^3}-60\frac{a''b''d'}{C^3}-60\frac{a''b'd''}{C^3}-60\frac{a'b''d''}{C^3}$$

$$+60\frac{a''c''d'}{C^3}+60\frac{a''c'd''}{C^3}+60\frac{a'c''d''}{C^3}-60\frac{b''c''d'}{C^3}-60\frac{b''c'd''}{C^3}-60\frac{b'c''d''}{C^3}$$

$$+60\frac{a'a''b''}{C^3}-60\frac{a'a''c''}{C^3}+60\frac{a'a''d''}{C^3}-60\frac{a''b'b''}{C^3}-60\frac{a''c'c''}{C^3}-60\frac{a''d'd''}{C^3}-60\frac{b'b''c''}{C^3}$$

$$+60\frac{b'b''d''}{C^3}+60\frac{b''c'c''}{C^3}+60\frac{b''d'd''}{C^3}+60\frac{c'c''d''}{C^3}-60\frac{c''d'd''}{C^3}$$

$$-90\frac{a'a''^2}{C^3}+90\frac{b'b''^2}{C^3}-90\frac{c'c''^2}{C^3}+90\frac{d'd''^2}{C^3}$$

$$-60\frac{a''b'^2c'}{C^4}-60\frac{a''b'c'^2}{C^4}-60\frac{a'b''c'^2}{C^4}-60\frac{a'^2b''c'}{C^4}-60\frac{a'^2b'c''}{C^4}-60\frac{a'b'^2c''}{C^4}$$

$$+60\frac{a''b'd'^2}{C^4}+60\frac{a''b'^2d'}{C^4}+60\frac{a'^2b''d'}{C^4}+60\frac{a'^2b'd''}{C^4}+60\frac{a'b'^2d''}{C^4}+60\frac{a'b''d'^2}{C^4}$$

$$-60\frac{a''c'd'^2}{C^4}-60\frac{a'c''d'^2}{C^4}-60\frac{a'^2c'd''}{C^4}-60\frac{a'^2c''d'}{C^4}-60\frac{a'c'^2d''}{C^4}-60\frac{a''c'^2d'}{C^4}$$

$$+60\frac{b'c''d'^2}{C^4}+60\frac{b'^2c''d'}{C^4}+60\frac{b'^2c'd''}{C^4}+60\frac{b''c'd'^2}{C^4}+60\frac{b''c'^2d'}{C^4}+60\frac{b'c'^2d''}{C^4}$$

$$+60\frac{a''b'^3}{C^4}-60\frac{a'^3b''}{C^4}+60\frac{a''c'^3}{C^4}+60\frac{a'^3c''}{C^4}-60\frac{a'^3d''}{C^4}+60\frac{a''d'^3}{C^4}-60\frac{b''d'^3}{C^4}-60\frac{b'^3d''}{C^4}$$

$$-60\frac{b''c'^3}{C^4}+60\frac{b'^3c''}{C^4}+60\frac{c''d'^3}{C^4}-60\frac{c'^3d''}{C^4}$$

$$-120\frac{a'a''b'c'}{C^4}-120\frac{a'a''c'd'}{C^4}-120\frac{a'c'c''d'}{C^4}-120\frac{a'b'c'c''}{C^4}+120\frac{a'a''b'd'}{C^4}-120\frac{a'b'b''c'}{C^4}$$

$$+120\frac{a'b'b''d'}{C^4}+120\frac{a'b'd'd''}{C^4}-120\frac{a'c'd'd''}{C^4}+120\frac{b'b''c'd'}{C^4}+120\frac{b'c'c''d'}{C^4}+120\frac{b'c'd'd''}{C^4}$$

$$+120\frac{a'a''c'^2}{C^4}+120\frac{a'^2c'c''}{C^4}-120\frac{b'b''d'^2}{C^4}-120\frac{b'^2d'd''}{C^4}$$

$$-180\frac{a'^2a''b'}{C^4}+180\frac{a'^2a''c'}{C^4}-180\frac{a'^2a''d'}{C^4}+180\frac{a'b'^2b''}{C^4}+180\frac{a'c'^2c''}{C^4}+180\frac{a'd'^2d''}{C^4}$$

$$+180\frac{b'^2b''c'}{C^4}-180\frac{b'^2b''d'}{C^4}-180\frac{b'c'^2c''}{C^4}-180\frac{b'd'^2d''}{C^4}-180\frac{c'^2c''d'}{C^4}+180\frac{c'd'^2d''}{C^4}$$

$$+240\frac{a'^3a''}{C^4}-240\frac{b'^3b''}{C^4}+240\frac{c'^3c''}{C^4}-240\frac{d'^3d''}{C^4}$$

$$-120\frac{a'^2b'c'd'}{C^5}+120\frac{a'b'^2c'd'}{C^5}-120\frac{a'b'c'^2d'}{C^5}+120\frac{a'b'c'd'^2}{C^5}$$

$$+120\frac{a'^3b'c'}{C^5}+120\frac{a'b'^3c'}{C^5}+120\frac{a'b'c'^3}{C^5}-120\frac{a'^3b'd'}{C^5}-120\frac{a'b'^3d'}{C^5}-120\frac{a'b'd'^3}{C^5}$$

$$+120\frac{a'^3c'd'}{C^5}+120\frac{a'c'^3d'}{C^5}+120\frac{a'c'd'^3}{C^5}-120\frac{b'^3c'd'}{C^5}-120\frac{b'c'^3d'}{C^5}-120\frac{b'c'd'^3}{C^5}$$

$$+120\frac{a'^2b'c'^2}{C^5}-120\frac{a'b'^2d'^2}{C^5}+120\frac{a'^2c'^2d'}{C^5}-120\frac{b'^2c'd'^2}{C^5}$$

$$-120\frac{a'^2c'^3}{C^5}-120\frac{a'^3c'^2}{C^5}+120\frac{b'^2d'^3}{C^5}+120\frac{b'^3d'^2}{C^5}$$

$$+120\frac{a'^4b'}{C^5}-120\frac{a'b'^4}{C^5}-120\frac{a'c'^4}{C^5}-120\frac{a'^4c'}{C^5}+120\frac{a'^4d'}{C^5}-120\frac{a'd'^4}{C^5}-120\frac{b'^4c'}{C^5}+120\frac{b'c'^4}{C^5}$$

$$+120\frac{b'^4d'}{C^5}+120\frac{b'd'^4}{C^5}+120\frac{c'^4d'}{C^5}-120\frac{c'd'^4}{C^5}$$

$$\left.-120\frac{a'^5}{C^5}+120\frac{b'^5}{C^5}-120\frac{c'^5}{C^5}+120\frac{d'^5}{C^5}\right)$$

$$==$$

$$-15\cdot\frac{24\sigma(1+\sigma-\sigma^2-\sigma^3)}{C^4(1+\sigma)^4}\left\{(1+1)\frac{2}{C(1+\sigma)^2}+\frac{2}{C}[(-\sigma)1-\sigma 1+\sigma(-1)-(-\sigma)(-1)\right.$$

$$\left.-4(-\sigma)\sigma]\frac{1^2}{(1+\sigma)^2}\right\}-15\cdot\frac{2(\sigma-1)}{C^2(1+\sigma)}\left\{[(1-\sigma-\sigma^2)+(1-\sigma-\sigma^2)]\frac{24}{C^3(1+\sigma)^4}+\frac{4}{C}[(-\sigma)1\right.$$

$$+(-\sigma)(2+\sigma)-(-\sigma)\sigma-(-\sigma)\sigma-\sigma 1-\sigma(2+\sigma)+\sigma(-1)+\sigma(-2-\sigma)-(-\sigma)(-1)$$

$$-(-\sigma)(-2-\sigma)-(-\sigma)\sigma-(-\sigma)\sigma+2(-\sigma)(-\sigma)+2\sigma\sigma]\frac{3(1-\sigma)}{C^2(1+\sigma)^4}$$

$$+\frac{6}{C}[-2\sigma^2\sigma^2+\sigma^2 1-\sigma^2 1-\sigma^2 1+\sigma^2 1+(\sigma^2)^2+(\sigma^2)^2]\frac{2^2}{C^2(1+\sigma)^4}$$

$$+\frac{12}{C^2}[-\sigma^2\sigma 1-(-\sigma)\sigma^2 1-(-\sigma)\sigma 1+\sigma^2\sigma^2+(-\sigma)^2\sigma^2+\sigma^2 1+(-\sigma)^2 1$$

$$-\sigma^2\sigma(-1)-(-\sigma)\sigma^2(-1)-(-\sigma)\sigma 1-3(-\sigma)^2\sigma^2-3\sigma^2\sigma^2$$

$$+2\sigma\sigma^2 1+2(-\sigma)\sigma\sigma^2+2(-\sigma)\sigma^2\sigma+2(-\sigma)\sigma^2(-1)]\frac{1^2\cdot 2}{(1+\sigma)^2\cdot C(1+\sigma)^2}$$

$$\left.+\frac{24}{C^3}[(-\sigma)\sigma^2 1-(-\sigma)\sigma^3-\sigma^3 1+(-\sigma)^2\sigma(-1)-(-\sigma)^3\sigma-(-\sigma)^3(-1)+(-\sigma)^4+\sigma^4]\frac{1}{(1+\sigma)^4}\right\}$$

$$+\Big\{\frac{12}{C}\Big[\sigma(-3-2\sigma+17\sigma^2+12\sigma^3)\cdot\sigma+(-\sigma)\cdot\sigma(3+2\sigma-17\sigma^2-12\sigma^3)-1\cdot(-8-\sigma+30\sigma^2+19\sigma^3)$$

$$-(8+\sigma-30\sigma^2-19\sigma^3)(-1)-(-\sigma)\cdot\sigma(-3-2\sigma+17\sigma^2+12\sigma^3)-\sigma\cdot\sigma(3+2\sigma-17\sigma^2-12\sigma^3)$$

$$+1\cdot(8+\sigma-30\sigma^2-19\sigma^3)+(-1)\cdot(-8-\sigma+30\sigma^2+19\sigma^3)\Big]\frac{15(1-\sigma)\cdot 1}{C^4(1+\sigma)^5\cdot(1+\sigma)}$$

$$+\frac{30}{C}\Big[\sigma^2\cdot\sigma^2(1-\sigma-\sigma^2)+\sigma^2(1-\sigma-\sigma^2)\cdot\sigma^2-(1-\sigma-\sigma^2)\cdot 1-1\cdot(1-\sigma-\sigma^2)$$

$$-\sigma^2\cdot\sigma^2(1-\sigma-\sigma^2)-\sigma^2\cdot\sigma^2(1-\sigma-\sigma^2)+1\cdot(1-\sigma-\sigma^2)+1\cdot(1-\sigma-\sigma^2)\Big]\frac{2\cdot 24}{C(1+\sigma)^2\cdot C^3(1+\sigma)^4}$$

$$+\frac{30}{C^2}\Big[\sigma^2(1-\sigma-\sigma^2)\cdot\sigma\cdot 1+(-\sigma)\cdot\sigma^2(1-\sigma-\sigma^2)\cdot 1+(-\sigma)\cdot\sigma\cdot(1-\sigma-\sigma^2)$$

$$+\sigma^2(1-\sigma-\sigma^2)\cdot\sigma\cdot(-1)+(-\sigma)\cdot\sigma^2(1-\sigma-\sigma^2)\cdot(-1)+(-\sigma)\cdot\sigma\cdot(1-\sigma-\sigma^2)$$

$$-\sigma^2(1-\sigma-\sigma^2)\cdot 1\cdot(-1)-(-\sigma)\cdot(1-\sigma-\sigma^2)\cdot(-1)-(-\sigma)\cdot 1\cdot(1-\sigma-\sigma^2)-\sigma^2(1-\sigma-\sigma^2)\cdot 1\cdot(-1)$$

$$-\sigma\cdot(1-\sigma-\sigma^2)\cdot(-1)-\sigma\cdot 1\cdot(1-\sigma-\sigma^2)-(-\sigma)^2\cdot\sigma^2(1-\sigma-\sigma^2)-\sigma^2(1-\sigma-\sigma^2)\cdot\sigma^2$$

$$-(-\sigma)^2\cdot(1-\sigma-\sigma^2)+\sigma^2(1-\sigma-\sigma^2)\cdot(-1)^2+\sigma^2(1-\sigma-\sigma^2)\cdot 1^2-\sigma^2\cdot(1-\sigma-\sigma^2)+1^2\cdot(1-\sigma-\sigma^2)$$

$$+(1-\sigma-\sigma^2)\cdot(-1)^2-2(-\sigma)\cdot\sigma^2(1-\sigma-\sigma^2)\cdot\sigma-2(-\sigma)\cdot\sigma^2(1-\sigma-\sigma^2)\cdot(-1)$$

$$-2(-\sigma)\cdot\sigma\cdot\sigma^2(1-\sigma-\sigma^2)+2(-\sigma)\cdot(-1)\cdot(1-\sigma-\sigma^2)-2\sigma\cdot\sigma^2(1-\sigma-\sigma^2)\cdot 1$$

$$+2\sigma\cdot 1\cdot(1-\sigma-\sigma^2)+2\cdot 1\cdot(1-\sigma-\sigma^2)\cdot(-1)+2\cdot 1\cdot(-1)\cdot(1-\sigma-\sigma^2)+3(-\sigma)^2\cdot\sigma^2(1-\sigma-\sigma^2)$$

$$+3\sigma^2\cdot\sigma^2(1-\sigma-\sigma^2)-3\cdot 1^2\cdot(1-\sigma-\sigma^2)-3(-1)^2\cdot(1-\sigma-\sigma^2)\Big]\frac{1^2\cdot 24}{(1+\sigma)^2\cdot C^3(1+\sigma)^4}$$

$$+\frac{20}{C}\Big[2(-\sigma)\sigma-2(2+\sigma)(-2-\sigma)-(-\sigma)^2-\sigma^2+(2+\sigma)^2+(-2-\sigma)^2\Big]\frac{3^2(1-\sigma)^2}{C^4(1+\sigma)^6}$$

$$+\frac{60}{C^2}\Big[(-\sigma)\sigma\sigma^2+\sigma^2\sigma(2+\sigma)+(-\sigma)\sigma^2(2+\sigma)+(-\sigma)\sigma^2 1+\sigma^2\sigma 1+(-\sigma)\sigma 1$$

$$+(-\sigma)\sigma^2(-2-\sigma)+(-\sigma)\sigma 1+(-\sigma)\sigma^2(-1)+(-\sigma)\sigma 1+\sigma^2\sigma(-1)+\sigma^2\sigma(-2-\sigma)$$

$$-(-\sigma)1(-2-\sigma)-(-\sigma)(2+\sigma)1-\sigma^2 1(-2-\sigma)-\sigma^2(2+\sigma)(-1)-(-\sigma)1(-1)-(-\sigma)1\cdot 1$$

$$-\sigma^2 1(-2-\sigma)-\sigma 1(-1)-\sigma 1\cdot 1-\sigma^2(2+\sigma)(-1)-\sigma(2+\sigma)1-\sigma 1(-2-\sigma)$$

$$-2(-\sigma)(-\sigma)\sigma^2-2(-\sigma)\sigma^2\sigma-2\sigma^2(-\sigma)\sigma-2\sigma^2(-\sigma)(-1)-2(-\sigma)\sigma^2(-2-\sigma)-2(-\sigma)(-\sigma)1$$

$$-2(-\sigma)\sigma\sigma^2-2(-\sigma)\sigma^2\sigma-2\sigma^2\sigma\sigma+2(-\sigma)(-1)1+2\sigma^2(-1)(-2-\sigma)+2(-\sigma)1(-2-\sigma)$$

$$-2\sigma\sigma 1-2\sigma\sigma^2(2+\sigma)-2\sigma^2\sigma 1+2\sigma 1\cdot 1+2\sigma 1(2+\sigma)+2\sigma^2 1(2+\sigma)$$

$$+2\cdot 1(2+\sigma)1+2\cdot 1\cdot 1(-2-\sigma)+2\cdot 1(2+\sigma)(-1)+2(2+\sigma)(-1)1+2\cdot 1(-1)(-2-\sigma)+2\cdot 1\cdot 1(-2-\sigma)$$

$$+6(-\sigma)\sigma^2(-\sigma)+6\sigma\sigma^2\sigma-6\cdot 1\cdot 1(2+\sigma)-6(-1)1(-2-\sigma)\Big]\frac{1\cdot 2\cdot 3(1-\sigma)}{(1+\sigma)\cdot C(1+\sigma)^2\cdot C^2(1+\sigma)^3}$$

$$\frac{120}{C^3}\Big[-(-\sigma)\sigma^2 1-(-\sigma)\sigma^2(2+\sigma)-(-\sigma)^2\sigma(-2-\sigma)-(-\sigma)^2\sigma(-1)+(-\sigma)1(-\sigma)^2+(-\sigma)(2+\sigma)(-1)^2$$

$$+\sigma 1^2(-2-\sigma)+\sigma 1^2(-1)+(-\sigma)\sigma^3+(-\sigma)^3\sigma+(-\sigma)^3(-2-\sigma)-(-\sigma)(-1)^3+\sigma^3(2+\sigma)-\sigma 1^3$$

$$-1^3(-2-\sigma)-(2+\sigma)(-1)^3-2(-\sigma)(-\sigma)\sigma(-1)-2(-\sigma)\sigma\sigma 1+2(-\sigma)1(-1)(-2-\sigma)+2\sigma 1(2+\sigma)(-1)$$

$$-4(-\sigma)^3(-\sigma)-4\sigma^3\sigma+4\cdot 1^3(2+\sigma)+4(-1)^3(-2-\sigma)+3(-\sigma)^2(-\sigma)\sigma+3(-\sigma)^2(-\sigma)(-1)+3(-\sigma)\sigma^2\sigma$$

$$-3(-\sigma)(-1)^2(-2-\sigma)+3\sigma^2\sigma 1-3\sigma 1^2(2+\sigma)-3\cdot 1^2(2+\sigma)(-1)-3\cdot 1(-1)^2(-2-\sigma)\Big]\frac{3(1-\sigma)\cdot 1^3}{C^2(1+\sigma)^3\cdot(1+\sigma)^3}$$

$$+\frac{90}{C^2}\Big[\sigma^2\sigma^2 1+\sigma^2\sigma^2 1-\sigma^2 1\cdot 1-\sigma^2 1\cdot 1-\sigma^2(\sigma^2)^2-(\sigma^2)^2\sigma^2+\sigma^2 1^2-(\sigma^2)^2 1$$

$$-(\sigma^2)^2 1+\sigma^2 1^2+1\cdot 1^2+1^2\cdot 1+(\sigma^2)^3+(\sigma^2)^3-1^3-1^3\Big]\frac{2^3}{C^3(1+\sigma)^6}$$

$$\frac{180}{C^3}\Big[(-\sigma)(\sigma^2)^2 1-\sigma^2\sigma^2 1-(-\sigma)^2\sigma^2 1-(\sigma^2)^2\sigma(-1)+\sigma^2 1(-1)^2+(-\sigma)1\cdot 1^2+\sigma^2 1^2\cdot 1$$

$$+\sigma 1^2(-1)-2(-\sigma)\sigma^2\sigma 1-2(-\sigma)\sigma^2\sigma^2(-1)-2(-\sigma)\sigma\sigma^2 1-2\sigma^2\sigma\sigma^2 1+2(-\sigma)1(-1)1$$

$$+2\sigma^2 1(-1)1+2\sigma 1\cdot 1\cdot 1+2\sigma^2 1\cdot 1(-1)+3(-\sigma)^2\sigma^2\sigma^2+3(-\sigma)(\sigma^2)^2\sigma+3(-\sigma)(\sigma^2)^2(-1)$$

$$+3(-\sigma)^2\sigma^2 1+3\sigma^2\sigma^2\sigma^2+3(-\sigma)\sigma(\sigma^2)^2-3(-\sigma)(-1)1^2-3\sigma^2(-1)^2 1+3\sigma^2\sigma^2 1+3\sigma(\sigma^2)^2 1$$

$$-3\sigma 1\cdot 1^2-3\sigma^2 1^2\cdot 1-3\cdot 1\cdot 1^2(-1)-3\cdot 1^2\cdot 1\cdot 1-3\cdot 1(-1)1^2-3\cdot 1(-1)^2 1$$

$$-6(-\sigma)^2(\sigma^2)^2-6\sigma^2(\sigma^2)^2+6\cdot 1^2\cdot 1^2+6(-1)^2 1^2\Big]\frac{2^2\cdot 1^2}{C^2(1+\sigma)^4\cdot(1+\sigma)^2}$$

$$+\frac{360}{C^4}\Big[-(-\sigma)^4\sigma^2-\sigma^2\sigma^4-(-\sigma)^4 1+\sigma^2(-1)^4-\sigma^4 1+\sigma^2 1^4+1^4\cdot 1+1(-1)^4+\sigma^2\sigma^3 1+(-\sigma)\sigma^3 1$$

$$+(-\sigma)^3\sigma^2(-1)+(-\sigma)^3\sigma 1-\sigma^2 1(-1)^3-(-\sigma)1(-1)^3-\sigma 1^3 1-\sigma^2 1^3(-1)-4(-\sigma)^3\sigma^2\sigma-4(-\sigma)^3\sigma^2(-1)$$

$$-4(-\sigma)\sigma^3\sigma^2+4(-\sigma)(-1)^3 1-4\sigma^3\sigma^2 1+4\sigma 1^3 1+4\cdot 1^3 1(-1)+4\cdot 1(-1)^3 1+3(-\sigma)^2\sigma^2\sigma(-1)$$

$$+3(-\sigma)\sigma^2\sigma^2 1-3(-\sigma)1(-1)^2 1-3\sigma 1^2 1(-1)+5(-\sigma)^4\sigma^2+5\sigma^4\sigma^2-5\cdot 1^4 1-5(-1)^4 1\Big]\frac{1^4\cdot 2}{(1+\sigma)^4\cdot C(1+\sigma)^2}$$

$$+\frac{720}{C^5}\Big[-(-\sigma)\sigma^4 1-(-\sigma)^4\sigma(-1)+(-\sigma)1(-1)^4+\sigma 1^4(-1)+(-\sigma)\sigma^5+(-\sigma)^5\sigma-(-\sigma)(-1)^5$$

$$+(-\sigma)^5(-1)-\sigma\cdot 1^5+\sigma^5 1-1(-1)^5-1^5(-1)$$

$$-(-\sigma)^6-\sigma^6+1^6+(-1)^6\Big]\frac{1^6}{(1+\sigma)^6}\Bigg\}$$

$$+6\Bigg\{\frac{2}{C}\Big[-\sigma(-3-2\sigma+17\sigma^2+12\sigma^3)+\sigma(3+2\sigma-17\sigma^2-12\sigma^3)-(8+\sigma-30\sigma^2-19\sigma^3)$$

$$+(-8-\sigma+30\sigma^2+19\sigma^3)\Big]\frac{15(1-\sigma)}{C^4(1+\sigma)^5}$$

$$+\frac{10}{C^2}\Big[(-\sigma)\cdot\sigma^2(1-\sigma-\sigma^2)-\sigma\cdot\sigma^2(1-\sigma-\sigma^2)+1\cdot(1-\sigma-\sigma^2)-(-1)(1-\sigma-\sigma^2)\Big]\frac{1\cdot 24}{(1+\sigma)\cdot C^3(1+\sigma)^4}$$

$$+\frac{20}{C^2}\left[\sigma^2(-\sigma)-\sigma^2\sigma+1(2+\sigma)-1(-2-\sigma)\right]\frac{2\cdot 3(1-\sigma)}{C(1+\sigma)^2\cdot C^2(1+\sigma)^3}+\frac{20}{C^3}\left[(-\sigma)^2\sigma-(-\sigma)\sigma^2\right.$$
$$-(-\sigma)(-1)^2+(-\sigma)^2(-2-\sigma)-(-\sigma)1^2-(-\sigma)^2(2+\sigma)+\sigma 1^2-\sigma^2(2+\sigma)+\sigma(-1)^2$$
$$+\sigma^2(-2-\sigma)+1^2(-2-\sigma)-(2+\sigma)(-1)^2+2(-\sigma)\sigma 1+2(-\sigma)\sigma 1+2(-\sigma)\sigma(2+\sigma)$$
$$-2(-\sigma)\sigma(-1)-2(-\sigma)\sigma(-1)-2(-\sigma)\sigma(-2-\sigma)+2(-\sigma)1(-1)+2(-\sigma)(2+\sigma)(-1)$$
$$+2(-\sigma)1(-2-\sigma)-2\sigma 1(-1)-2\sigma(2+\sigma)(-1)-2\sigma 1(-2-\sigma)+2(-\sigma)(-\sigma)\sigma$$
$$-2(-\sigma)(-\sigma)1+2(-\sigma)(-\sigma)(-1)-2(-\sigma)\sigma\sigma-2(-\sigma)1(2+\sigma)-2(-\sigma)(-1)(-2-\sigma)$$
$$-2\sigma\sigma 1+2\sigma\sigma(-1)+2\sigma 1(2+\sigma)+2\sigma(-1)(-2-\sigma)+2\cdot 1(2+\sigma)(-1)-2\cdot 1(-1)(-2-\sigma)$$
$$\left.-3(-\sigma)^2(-\sigma)+3\sigma^2\sigma-3\cdot 1^2(2+\sigma)+3(-1)^2(-2-\sigma)\right]\frac{1^2\cdot 3(1-\sigma)}{(1+\sigma)^2\cdot C^2(1+\sigma)^3}$$

$$+\frac{30}{C^3}\left[(\sigma^2)^2\sigma-(-\sigma)(\sigma^2)^2-(\sigma^2)^2 1-(-\sigma)1^2+(\sigma^2)^2(-1)-(-\sigma)1^2+\sigma 1^2-(\sigma^2)^2 1+\sigma 1^2\right.$$
$$+(\sigma^2)^2(-1)-1\cdot 1^2+1^2(-1)+2\sigma^2\sigma^2 1+2\sigma^2\sigma 1+2(-\sigma)\sigma^2 1-2\sigma^2\sigma^2(-1)-2\sigma^2\sigma 1$$
$$-2(-\sigma)\sigma^2 1+2\sigma^2 1(-1)+2\sigma^2 1\cdot 1+2(-\sigma)1\cdot 1-2\sigma^2 1(-1)-2\sigma^2 1\cdot 1-2\sigma 1\cdot 1$$
$$+2(-\sigma)\sigma^2\sigma^2-2(-\sigma)\sigma^2 1+2(-\sigma)\sigma^2 1-2\sigma^2\sigma\sigma^2-2\sigma^2 1\cdot 1-2\sigma^2(-1)1-2\sigma\sigma^2 1$$
$$+2\sigma\sigma^2 1+2\sigma^2 1\cdot 1+2\sigma^2(-1)1+2\cdot 1\cdot 1\cdot 1-2\cdot 1(-1)1$$
$$\left.-3(-\sigma)(\sigma^2)^2+3\sigma(\sigma^2)^2-3\cdot 1\cdot 1^2+3(-1)1^2\right]\frac{1\cdot 2^2}{(1+\sigma)\cdot C^2(1+\sigma)^4}$$

$$+\frac{60}{C^4}\left[-\sigma^2\sigma^2 1-\sigma^2\sigma 1^2-(-\sigma)\sigma^2 1^2-(-\sigma)^2\sigma^2 1-(-\sigma)^2\sigma 1-(-\sigma)\sigma^2 1+\sigma^2\sigma(-1)^2\right.$$
$$+\sigma^2\sigma^2(-1)+(-\sigma)^2\sigma^2(-1)+(-\sigma)^2\sigma 1+(-\sigma)\sigma^2 1+(-\sigma)\sigma^2(-1)^2-\sigma^2 1(-1)^2$$
$$-(-\sigma)1(-1)^2-(-\sigma)^2 1\cdot 1-(-\sigma)^2 1(-1)-(-\sigma)1^2 1-\sigma^2 1^2(-1)+\sigma 1(-1)^2+\sigma^2 1(-1)$$
$$+\sigma^2 1\cdot 1+\sigma^2 1(-1)^2+\sigma^2 1^2(-1)+\sigma 1^2 1+\sigma^2\sigma^3-(-\sigma)^3\sigma^2+\sigma^2 1^3+(-\sigma)^3 1-(-\sigma)^3 1$$
$$+\sigma^2(-1)^3-\sigma^2(-1)^3-\sigma^3 1-\sigma^2 1^3+\sigma^3 1+1(-1)^3-1^3 1-2(-\sigma)\sigma^2\sigma 1-2(-\sigma)\sigma^2 1(-1)$$
$$-2(-\sigma)1\cdot 1(-1)-2(-\sigma)\sigma 1\cdot 1+2(-\sigma)\sigma^2\sigma(-1)-2(-\sigma)\sigma\sigma^2 1+2(-\sigma)\sigma\sigma^2(-1)$$
$$+2(-\sigma)\sigma(-1)1-2(-\sigma)1(-1)1+2\sigma\sigma^2 1(-1)+2\sigma 1\cdot 1(-1)+2\sigma 1(-1)1+2(-\sigma)\sigma^2 1^2$$
$$+2(-\sigma)^2 1\cdot 1-2\sigma\sigma^2(-1)^2-2\sigma^2(-1)1-3(-\sigma)^2\sigma^2\sigma+3(-\sigma)^2\sigma^2 1-3(-\sigma)^2\sigma^2(-1)$$
$$+3(-\sigma)\sigma^2\sigma^2+3(-\sigma)1^2 1+3(-\sigma)(-1)^2 1+3\sigma^2\sigma^2 1-3\sigma^2\sigma^2(-1)-3\sigma 1^2 1-3\sigma(-1)^2 1$$
$$\left.-3\cdot 1^2 1(-1)+3\cdot 1(-1)^2 1+4(-\sigma)^3\sigma^2-4\sigma^3\sigma^2+4\cdot 1^3 1-4(-1)^3 1\right]\frac{1^3\cdot 2}{(1+\sigma)^3\cdot C(1+\sigma)^2}$$

$$+\frac{120}{C^5}\Big[-(-\sigma)^2\sigma 1(-1)+(-\sigma)\sigma^2 1(-1)-(-\sigma)\sigma 1^2(-1)+(-\sigma)\sigma 1(-1)^2$$

$$+(-\sigma)^3\sigma 1+(-\sigma)\sigma^3 1+(-\sigma)\sigma 1^3-(-\sigma)^3\sigma(-1)-(-\sigma)\sigma^3(-1)-(-\sigma)\sigma(-1)^3$$

$$+(-\sigma)^3 1(-1)+(-\sigma)1^3(-1)+(-\sigma)1(-1)^3-\sigma^3 1(-1)-\sigma 1^3(-1)-\sigma 1(-1)^3$$

$$+(-\sigma)^2\sigma 1^2-(-\sigma)\sigma^2(-1)^2+(-\sigma)^2 1^2(-1)-\sigma^2 1(-1)^2$$

$$-(-\sigma)^2 1^3-(-\sigma)^3 1^2+\sigma^2(-1)^3+\sigma^3(-1)^2$$

$$+(-\sigma)^4\sigma-(-\sigma)\sigma^4-(-\sigma)1^4-(-\sigma)^4 1+(-\sigma)^4(-1)-(-\sigma)(-1)^4-\sigma^4 1+\sigma 1^4+\sigma^4(-1)$$

$$+\sigma(-1)^4+1^4(-1)-1(-1)^4-(-\sigma)^5-\sigma^5+1^5+(-1)^5\Big]\frac{1^5}{(1+\sigma)^5}\Bigg\}$$

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$$-\frac{360\sigma(1+\sigma-\sigma^2-\sigma^3)}{C^4(1+\sigma)^4}\left\{\frac{4}{C(1+\sigma)^2}+\frac{2}{C}\left[-4\sigma+4\sigma^2\right]\frac{1^2}{(1+\sigma)^2}\right\}$$

$$-\frac{30(\sigma-1)}{C^2(1+\sigma)}\Bigg\{\left[2(1-\sigma-\sigma^2)\right]\frac{24}{C^3(1+\sigma)^4}+\frac{4}{C}\left[-12\sigma+4\sigma^2\right]\frac{3(1-\sigma)}{C^2(1+\sigma)^4}+\frac{6}{C}[0]\frac{2^2}{C^2(1+\sigma)^4}$$

$$+\frac{12}{C^2}\left[4\sigma^2+4\sigma^3-8\sigma^4\right]\frac{2}{C(1+\sigma)^4}+\frac{24}{C^3}\left[-4\sigma^3+4\sigma^4\right]\frac{1}{(1+\sigma)^4}\Bigg\}$$

$$+\Bigg\{\frac{12}{C}\left[(8+\sigma-33\sigma^2-21\sigma^3+17\sigma^4+12\sigma^5)\right]\frac{60(1-\sigma)}{C^4(1+\sigma)^6}$$

$$+\frac{30}{C}[0]\frac{48}{C^4(1+\sigma)^6}$$

$$+\frac{30}{C^2}\left[-8(1-\sigma-\sigma^2)+4\sigma(1-\sigma-\sigma^2)-4\sigma^3(1-\sigma-\sigma^2)+8\sigma^4(1-\sigma-\sigma^2)\right]\frac{24}{C^3(1+\sigma)^6}$$

$$+\frac{20}{C}\left[-4\sigma^2+3(2+\sigma)^2+(2+\sigma)^4\right]\frac{3^2(1-\sigma)^2}{C^4(1+\sigma)^6}$$

$$+\frac{60}{C^2}\left[-32-4\sigma+13\sigma^2-4\sigma^3+11\sigma^4\right]\frac{1\cdot 2\cdot 3(1-\sigma)}{C^3(1+\sigma)^6}$$

$$\frac{120}{C^3}\left[+32-11\sigma-12\sigma^2+19\sigma^3-12\sigma^4\right]\frac{3(1-\sigma)\cdot 1^3}{C^2(1+\sigma)^6}$$

$$+\frac{90}{C^2}[0]\frac{2^3}{C^3(1+\sigma)^6}+\frac{180}{C^3}\left[\;+12-4\sigma-8\sigma^2+8\sigma^4+2\sigma^5-12\sigma^6\;\right]\frac{2^2\cdot 1^2}{C^2(1+\sigma)^6}$$

$$+\frac{360}{C^4}\left[-16+12\sigma+4\sigma^2-4\sigma^4-12\sigma^5+16\sigma^6\right]\frac{1^4\cdot 2}{C(1+\sigma)^6}+\frac{720}{C^5}\left[4-4\sigma+4\sigma^5-4\sigma^6\right]\frac{1^6}{(1+\sigma)^6}\Bigg\}$$

$$+6\left\{\frac{2}{C}\left[\ (-8+2\sigma+32\sigma^2+2\sigma^3-12\sigma^4)\ \right]\frac{30(1-\sigma)}{C^4(1+\sigma)^5}\right.$$

$$+\frac{10}{C^2}\left[\ -2\sigma^3(1-\sigma-\sigma^2)+2(1-\sigma-\sigma^2)\ \right]\frac{1\cdot 24}{C^3(1+\sigma)^5}$$

$$+\frac{20}{C^2}\left[-\sigma^3+(2+\sigma)\right]\frac{4\cdot 3(1-\sigma)}{C^3(1+\sigma)^5}+\frac{20}{C^3}\left[-24+28\sigma-16\sigma^2+4\sigma^3\right]\frac{1^2\cdot 3(1-\sigma)}{C^2(1+\sigma)^5}$$

$$+\frac{30}{C^3}\left[-4+4\sigma^5\right]\frac{1\cdot 2^2}{C^2(1+\sigma)^5}$$

$$+\frac{60}{C^4}\left[+12-16\sigma+8\sigma^2-8\sigma^3+16\sigma^4-12\sigma^5\right]\frac{1^3\cdot 2}{C(1+\sigma)^5}$$

$$\left.+\frac{120}{C^5}\left[-2+8\sigma-8\sigma^2+8\sigma^3-8\sigma^4+2\sigma^5\ \right]\frac{1^5}{(1+\sigma)^5}\right\}$$

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$$-\frac{360\sigma(1+\sigma-\sigma^2-\sigma^3)}{C^5(1+\sigma)^6}\left\{+4-8\sigma+8\sigma^2\right\}-\frac{360(\sigma-1)4}{C^5(1+\sigma)^5}\left\{1-4\sigma+5\sigma^2-\sigma^3-2\sigma^4\right\}$$

$$+\frac{1}{C^5(1+\sigma)^6}\left\{2\left[(8+\sigma-33\sigma^2-21\sigma^3+17\sigma^4+12\sigma^5)\right]360(1-\sigma)\right.$$

$$+0+360\left[(-8+12\sigma+4\sigma^2-8\sigma^3+12\sigma^4-4\sigma^5-8\sigma^6)\right]2$$

$$+60\left[-4\sigma^2+3(2+\sigma)^2+(2+\sigma)^4\right]3(1-\sigma)^2+360\left[-32-4\sigma+13\sigma^2-4\sigma^3+11\sigma^4\right](1-\sigma)$$

$$360\left[+32-11\sigma-12\sigma^2+19\sigma^3-12\sigma^4\right](1-\sigma)+0+360\left[+12-4\sigma-8\sigma^2+8\sigma^4+2\sigma^5-12\sigma^6\right]2$$

$$\left.+360\left[-16+12\sigma+4\sigma^2-4\sigma^4-12\sigma^5+16\sigma^6\right]2+360\left[4-4\sigma+4\sigma^5-4\sigma^6\right]2\right\}$$

$$+\frac{6}{C^5(1+\sigma)^5}\left\{\ \left[\ (-8+2\sigma+32\sigma^2+2\sigma^3-12\sigma^4)\ \right]60(1-\sigma)+\left[\ 1-\sigma^3\ \right](1-\sigma-\sigma^2)480\right.$$

$$+240\left[-\sigma^3+(2+\sigma)\right](1-\sigma)+60\left[-24+28\sigma-16\sigma^2+4\sigma^3\right](1-\sigma)$$

$$+120\left[-4+4\sigma^5\right]+120\left[+12-16\sigma+8\sigma^2-8\sigma^3+16\sigma^4-12\sigma^5\right]$$

$$\left.+120\left[-2+8\sigma-8\sigma^2+8\sigma^3-8\sigma^4+2\sigma^5\ \right]\ \right\}$$

==

$$-\frac{360\sigma(1-\sigma)(1+2\sigma+\sigma^2)}{C^5(1+\sigma)^6}\left\{+4-8\sigma+8\sigma^2\right\}+\frac{360(1-\sigma)4}{C^5(1+\sigma)^5}\left\{1-4\sigma+5\sigma^2-\sigma^3-2\sigma^4\right\}$$

$$+\frac{1}{C^5(1+\sigma)^6}\left\{\left[(16-13\sigma-65\sigma^2-27\sigma^3+33\sigma^4+24\sigma^5)\right]360(1-\sigma)\right.$$

$$+60\left[-4\sigma^2+3(2+\sigma)^2+(2+\sigma)^4\right]3(1-\sigma)^2$$

$$\left.+360\left[\ -8+16\sigma-8\sigma^3+16\sigma^4-10\sigma^5-8\sigma^6\ \right]2\right\}$$

$$+\frac{6}{C^5(1+\sigma)^5}\left\{\ \left[\ (-16+34\sigma+8\sigma^2-14\sigma^3-20\sigma^4)\ \right]60(1-\sigma)\right.$$

$$\left.+120\left[\ +6-8\sigma+8\sigma^4-6\sigma^5\ \right]\ \right\}$$

==

$$+\frac{360(1-\sigma)4}{C^5(1+\sigma)^5}\left\{1-5\sigma+6\sigma^2-\sigma^3-4\sigma^4\right\}$$

$$+\frac{1}{C^5(1+\sigma)^6}\left\{\left[(16-13\sigma-65\sigma^2-27\sigma^3+33\sigma^4+24\sigma^5)\right]360(1-\sigma)\right.$$

$$+60\left[-4\sigma^2+3(2+\sigma)^2+(2+\sigma)^4\right]3(1-\sigma)^2$$

$$\left.+360\left[\ -8+16\sigma-8\sigma^3+16\sigma^4-10\sigma^5-8\sigma^6\ \right]2\right\}$$

$$+\frac{6}{C^5(1+\sigma)^5}\left\{\left[\ -2+17\sigma-13\sigma^2-11\sigma^3+5\sigma^4+4\sigma^5\ \right]120\right\}$$

==

$$+\frac{360\cdot 2}{C^5(1+\sigma)^5}\left\{2-12\sigma+22\sigma^2-14\sigma^3-6\sigma^4+8\sigma^5\right\}+\frac{2}{C^5(1+\sigma)^5}\left\{\left[\ -2+17\sigma-13\sigma^2-11\sigma^3+5\sigma^4+4\sigma^5\ \right]360\right\}$$

$$+\frac{1}{C^5(1+\sigma)^6}\left\{\left[(16-13\sigma-65\sigma^2-27\sigma^3+33\sigma^4+24\sigma^5)\right]360(1-\sigma)\right.$$

$$+60\left[-4\sigma^2+3(2+\sigma)^2+(2+\sigma)^4\right]3(1-\sigma)^2$$

$$\left.+360\left[\ -16+32\sigma-16\sigma^3+32\sigma^4-20\sigma^5-16\sigma^6\ \right]\ \right\}$$

==

$$+\frac{180}{C^5(1+\sigma)^6}\left\{+26\sigma-48\sigma^2-20\sigma^3+80\sigma^4-14\sigma^5-32\sigma^6\right\}$$

$$\left.+\frac{180}{C^5(1+\sigma)^6}\left[-4\sigma^2+3(2+\sigma)^2+(2+\sigma)^4\right](1-\sigma)^2\quad\right\}$$

==

$$+\frac{180}{C^5(1+\sigma)^6}\left\{+26\sigma-48\sigma^2-20\sigma^3+80\sigma^4-14\sigma^5-32\sigma^6\right\}$$

$$+\frac{180}{C^5(1+\sigma)^6}\left[-4\sigma^2+3(4+4\sigma+\sigma^2)+(2^4+4\cdot 2^3\sigma+6\cdot 2^2\sigma^2+4\cdot 2\sigma^3+\sigma^4)\right](1-2\sigma+\sigma^2) ==$$

$$+\frac{180}{C^5(1+\sigma)^6}\left\{+26\sigma-48\sigma^2-20\sigma^3+80\sigma^4-14\sigma^5-32\sigma^6\right\}$$

$$+\frac{180}{C^5(1+\sigma)^6}\left[\ (28+44\sigma+23\sigma^2+8\sigma^3+\sigma^4)\right](1-2\sigma+\sigma^2)$$

==

$$\frac{180}{C^5(1+\sigma)^6}(28+14\sigma-85\sigma^2-14\sigma^3+88\sigma^4-8\sigma^5-31\sigma^6)$$

Then the 6th five simultaneous equations 1⑥ 2⑥ 3⑥ 4⑥ 5⑥ is

$$\begin{pmatrix} 1 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 1 & 0 \\ (-1) & 1 & 1 & (-1) & 0 \\ \frac{1}{\sigma} & \frac{(-1)}{\sigma} & 1 & (-1) & 0 \\ (-1) & (-1) & 1 & 1 & 2C \end{pmatrix}\begin{pmatrix} a'''''' \\ b'''''' \\ c'''''' \\ d'''''' \\ \varphi_3'''''' \end{pmatrix}=\begin{pmatrix} (8\sigma^2-6\sigma^3-52\sigma^4+26\sigma^5+40\sigma^6) \\ (8\sigma^2-6\sigma^3-52\sigma^4+26\sigma^5+40\sigma^6) \\ 0 \\ 0 \\ (28+14\sigma-85\sigma^2-14\sigma^3+88\sigma^4-8\sigma^5-31\sigma^6) \end{pmatrix}\frac{180}{C^5(1+\sigma)^6}$$

Then we get $\begin{pmatrix} a'''''' \\ b'''''' \\ c'''''' \\ d'''''' \\ \varphi_3'''''' \end{pmatrix}$

$$= \begin{pmatrix} 1 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 1 & 0 \\ (-1) & 1 & 1 & (-1) & 0 \\ \frac{1}{\sigma} & \frac{(-1)}{\sigma} & 1 & (-1) & 0 \\ (-1) & (-1) & 1 & 1 & 2C \end{pmatrix}^{-1} \begin{pmatrix} (8\sigma^2 - 6\sigma^3 - 52\sigma^4 + 26\sigma^5 + 40\sigma^6) \\ (8\sigma^2 - 6\sigma^3 - 52\sigma^4 + 26\sigma^5 + 40\sigma^6) \\ 0 \\ 0 \\ (28 + 14\sigma - 85\sigma^2 - 14\sigma^3 + 88\sigma^4 - 8\sigma^5 - 31\sigma^6) \end{pmatrix} \frac{180}{C^5(1+\sigma)^6}$$

$$= \begin{pmatrix} 1 & 0 & \frac{(-1)\sigma}{(1+\sigma)} & \frac{\sigma}{(1+\sigma)} & 0 \\ 1 & 0 & \frac{\sigma}{(1+\sigma)} & \frac{(-1)\sigma}{(1+\sigma)} & 0 \\ 0 & 1 & \frac{1}{(1+\sigma)} & \frac{\sigma}{(1+\sigma)} & 0 \\ 0 & 1 & \frac{(-1)}{(1+\sigma)} & \frac{(-1)\sigma}{(1+\sigma)} & 0 \\ \frac{1}{C} & \frac{(-1)}{C} & 0 & 0 & \frac{1}{C} \end{pmatrix} \frac{1}{2} \begin{pmatrix} (8\sigma^2 - 6\sigma^3 - 52\sigma^4 + 26\sigma^5 + 40\sigma^6) \\ (8\sigma^2 - 6\sigma^3 - 52\sigma^4 + 26\sigma^5 + 40\sigma^6) \\ 0 \\ 0 \\ (28 + 14\sigma - 85\sigma^2 - 14\sigma^3 + 88\sigma^4 - 8\sigma^5 - 31\sigma^6) \end{pmatrix} \frac{180}{C^5(1+\sigma)^6}$$

$$= \begin{pmatrix} 1 & 0 & \frac{(-1)\sigma}{(1+\sigma)} & \frac{\sigma}{(1+\sigma)} & 0 \\ 1 & 0 & \frac{\sigma}{(1+\sigma)} & \frac{(-1)\sigma}{(1+\sigma)} & 0 \\ 0 & 1 & \frac{1}{(1+\sigma)} & \frac{\sigma}{(1+\sigma)} & 0 \\ 0 & 1 & \frac{(-1)}{(1+\sigma)} & \frac{(-1)\sigma}{(1+\sigma)} & 0 \\ \frac{1}{C} & \frac{(-1)}{C} & 0 & 0 & \frac{1}{C} \end{pmatrix} \begin{pmatrix} (8\sigma^2 - 6\sigma^3 - 52\sigma^4 + 26\sigma^5 + 40\sigma^6) \\ (8\sigma^2 - 6\sigma^3 - 52\sigma^4 + 26\sigma^5 + 40\sigma^6) \\ 0 \\ 0 \\ (28 + 14\sigma - 85\sigma^2 - 14\sigma^3 + 88\sigma^4 - 8\sigma^5 - 31\sigma^6) \end{pmatrix} \frac{90}{C^5(1+\sigma)^6}$$

$$= \begin{pmatrix} (8\sigma^2 - 6\sigma^3 - 52\sigma^4 + 26\sigma^5 + 40\sigma^6) \\ (8\sigma^2 - 6\sigma^3 - 52\sigma^4 + 26\sigma^5 + 40\sigma^6) \\ (8\sigma^2 - 6\sigma^3 - 52\sigma^4 + 26\sigma^5 + 40\sigma^6) \\ (8\sigma^2 - 6\sigma^3 - 52\sigma^4 + 26\sigma^5 + 40\sigma^6) \\ \frac{(28 + 14\sigma - 85\sigma^2 - 14\sigma^3 + 88\sigma^4 - 8\sigma^5 - 31\sigma^6)}{C} \end{pmatrix} \frac{90}{C^5(1+\sigma)^6}$$

Then, the approximate formula of Tayor series expansions are

$$f(x)=f(0)+\frac{f'(0)}{1!}x+\frac{f''(0)}{2!}x^2+\frac{f'''(0)}{3!}x^3+\frac{f''''(0)}{4!}x^4+\frac{f'''''(0)}{5!}x^5+\frac{f''''''(0)}{6!}x^6+\cdots\cdots$$

$$C_{-ax}=C+\frac{(-\sigma)}{(1+\sigma)}v+\frac{\sigma^2}{C(1+\sigma)^2}v^2+\frac{(-\sigma)(1-\sigma)}{2C^2(1+\sigma)^3}v^3+\frac{\sigma^2(1-\sigma-\sigma^2)}{C^3(1+\sigma)^4}v^4$$
$$+\frac{(1-\sigma)\sigma(-3-2\sigma+17\sigma^2+12\sigma^3)}{8C^4(1+\sigma)^5}v^5+\frac{(4\sigma^2-3\sigma^3-26\sigma^4+13\sigma^5+20\sigma^6)}{4C^5(1+\sigma)^6}v^6+\cdots\cdots$$

$$C_{ax}=C+\frac{\sigma}{(1+\sigma)}v+\frac{\sigma^2}{C(1+\sigma)^2}v^2+\frac{\sigma(1-\sigma)}{2C^2(1+\sigma)^3}v^3+\frac{\sigma^2(1-\sigma-\sigma^2)}{C^3(1+\sigma)^4}v^4$$
$$+\frac{(1-\sigma)\sigma(3+2\sigma-17\sigma^2-12\sigma^3)}{8C^4(1+\sigma)^5}v^5+\frac{(4\sigma^2-3\sigma^3-26\sigma^4+13\sigma^5+20\sigma^6)}{4C^5(1+\sigma)^6}v^6+\cdots\cdots$$

$$C_{-x}=C+\frac{1}{(1+\sigma)}v+\frac{1}{C(1+\sigma)^2}v^2+\frac{(2+\sigma)(1-\sigma)}{2C^2(1+\sigma)^3}v^3+\frac{(1-\sigma-\sigma^2)}{C^3(1+\sigma)^4}v^4$$
$$+\frac{(1-\sigma)(8+\sigma-30\sigma^2-19\sigma^3)}{8C^4(1+\sigma)^5}v^5+\frac{(4\sigma^2-3\sigma^3-26\sigma^4+13\sigma^5+20\sigma^6)}{4C^5(1+\sigma)^6}v^6+\cdots\cdots$$

$$C_{x}=C+\frac{(-1)}{(1+\sigma)}v+\frac{1}{C(1+\sigma)^2}v^2+\frac{(-2-\sigma)(1-\sigma)}{2C^2(1+\sigma)^3}v^3+\frac{(1-\sigma-\sigma^2)}{C^3(1+\sigma)^4}v^4$$
$$-\frac{(1-\sigma)(8+\sigma-30\sigma^2-19\sigma^3)}{8C^4(1+\sigma)^5}v^5+\frac{(4\sigma^2-3\sigma^3-26\sigma^4+13\sigma^5+20\sigma^6)}{4C^5(1+\sigma)^6}v^6+\cdots\cdots$$

$$\varphi_3=1+0+\frac{(\sigma-1)}{(1+\sigma)}\left(\frac{v}{C}\right)^2+0+\frac{\sigma(1+\sigma-\sigma^2-\sigma^3)}{(1+\sigma)^4}\left(\frac{v}{C}\right)^4+0$$
$$+\frac{(28+14\sigma-85\sigma^2-14\sigma^3+88\sigma^4-8\sigma^5-31\sigma^6)}{8(1+\sigma)^6}\left(\frac{v}{C}\right)^6+\cdots\cdots$$
$$=1+\frac{(\sigma-1)}{(1+\sigma)}\left(\frac{v}{C}\right)^2+\frac{\sigma[(1+\sigma)-\sigma^2(1+\sigma)]}{(1+\sigma)^4}\left(\frac{v}{C}\right)^4$$
$$+\frac{(28+14\sigma-85\sigma^2-14\sigma^3+88\sigma^4-8\sigma^5-31\sigma^6)}{8(1+\sigma)^6}\left(\frac{v}{C}\right)^6+\cdots\cdots$$
$$=1+\frac{(\sigma-1)}{(1+\sigma)}\left(\frac{v}{C}\right)^2+\frac{\sigma(1-\sigma)}{(1+\sigma)^2}\left(\frac{v}{C}\right)^4+\frac{(28+14\sigma-85\sigma^2-14\sigma^3+88\sigma^4-8\sigma^5-31\sigma^6)}{8(1+\sigma)^6}\left(\frac{v}{C}\right)^6+\cdots\cdots$$

## 1. Count the Approximate Value Of $\Lambda$ When $v\to 0$

$$\lambda=\frac{(-v+C_{-x}\varphi_3)(v+C_x\varphi_3)}{C_xC_{-x}\varphi_3}=\frac{v}{C_xC_{-x}}\left[\frac{(-v)}{\varphi_3}+C_{-x}-C_x\right]+\varphi_3\,.$$

In the appendix XI we have find out the **approximate formulae** of the $C_{-x}$, $C_x$ and $\varphi_3$.

Taking note of that $\frac{1}{(1\pm x)^{\gamma}}=1\mp\gamma\cdot x+\frac{\gamma(\gamma+1)}{2!}\cdot x^2\mp\ldots\ldots(\gamma>0,|x|<1)$ we get (neglect more higher order infinitely small than $(v/C)^6$)

At first we see how much the $\left[\frac{(-v)}{\varphi_3}+C_{-x}-C_x\right]$ is:

$$\left[\frac{(-v)}{\varphi_3}+C_{-x}-C_x\right]\approx$$

$$\frac{(-v)}{\left\{1+\left[\frac{(\sigma-1)}{(1+\sigma)}\left(\frac{v}{C}\right)^2+\frac{\sigma(1+\sigma-\sigma^2-\sigma^3)}{(1+\sigma)^4}\left(\frac{v}{C}\right)^4+\frac{(28+14\sigma-85\sigma^2-14\sigma^3+88\sigma^4-8\sigma^5-31\sigma^6)}{8(1+\sigma)^6}\left(\frac{v}{C}\right)^6\right]\right\}}$$

$$+\frac{2\cdot v}{(1+\sigma)}+0v^2+\frac{(2+\sigma)(1-\sigma)}{C^2(1+\sigma)^3}v^3+0v^4+\frac{(1-\sigma)(8+\sigma-30\sigma^2-19\sigma^3)}{4C^4(1+\sigma)^5}v^5+0v^6$$

Taking the [ ] as the $x$ in the $\frac{1}{(1\pm x)^{\gamma}}=1\mp\gamma\cdot x+\frac{\gamma(\gamma+1)}{2!}\cdot x^2\mp\ldots\ldots$ above will be

$$\approx(-v)\left\{1-\left[\frac{(\sigma-1)}{(1+\sigma)}\left(\frac{v}{C}\right)^2+\frac{\sigma(1+\sigma-\sigma^2-\sigma^3)}{(1+\sigma)^4}\left(\frac{v}{C}\right)^4\right.\right.$$

$$\left.\left.+\frac{(28+14\sigma-85\sigma^2-14\sigma^3+88\sigma^4-8\sigma^5-31\sigma^6)}{8(1+\sigma)^6}\left(\frac{v}{C}\right)^6\right]\right\}$$

$$+\frac{2\cdot v}{(1+\sigma)}+\frac{(2+\sigma)(1-\sigma)}{C^2(1+\sigma)^3}v^3+\frac{(1-\sigma)(8+\sigma-30\sigma^2-19\sigma^3)}{4C^4(1+\sigma)^5}v^5$$

$$=v\left\{-1+\left[\frac{(\sigma-1)}{(1+\sigma)}\left(\frac{v}{C}\right)^2+\frac{\sigma(1+\sigma-\sigma^2-\sigma^3)}{(1+\sigma)^4}\left(\frac{v}{C}\right)^4\right.\right.$$

$$\left.+\frac{(28+14\sigma-85\sigma^2-14\sigma^3+88\sigma^4-8\sigma^5-31\sigma^6)}{8(1+\sigma)^6}\left(\frac{v}{C}\right)^6\right]+\frac{2}{(1+\sigma)}+\frac{(2+\sigma)(1-\sigma)}{C^2(1+\sigma)^3}v^2$$

$$\left.+\frac{(1-\sigma)(8+\sigma-30\sigma^2-19\sigma^3)}{4C^4(1+\sigma)^5}v^4\right\}$$

$$= v\left\{\frac{-1-\sigma+2}{(1+\sigma)} + \left[\frac{(\sigma-1)}{(1+\sigma)} + \frac{(2+\sigma)(1-\sigma)}{(1+\sigma)^3}\right]\left(\frac{v}{C}\right)^2\right.$$

$$+\left[\frac{\sigma(1+\sigma-\sigma^2-\sigma^3)}{(1+\sigma)^4} + \frac{(1-\sigma)(8+\sigma-30\sigma^2-19\sigma^3)}{4(1+\sigma)^5}\right]\left(\frac{v}{C}\right)^4$$

$$\left. + \frac{(28+14\sigma-85\sigma^2-14\sigma^3+88\sigma^4-8\sigma^5-31\sigma^6)}{8(1+\sigma)^6}\left(\frac{v}{C}\right)^6\right\}$$

$$= v\left\{\frac{1-\sigma}{(1+\sigma)} + (1-\sigma)\left[\frac{-1}{(1+\sigma)} + \frac{(2+\sigma)}{(1+\sigma)^3}\right]\left(\frac{v}{C}\right)^2\right.$$

$$+(1-\sigma)\left[\frac{(\sigma+2\sigma^2+\sigma^3)}{(1+\sigma)^4} + \frac{(8+\sigma-30\sigma^2-19\sigma^3)}{4(1+\sigma)^5}\right]\left(\frac{v}{C}\right)^4$$

$$\left. + \frac{(28+14\sigma-85\sigma^2-14\sigma^3+88\sigma^4-8\sigma^5-31\sigma^6)}{8(1+\sigma)^6}\left(\frac{v}{C}\right)^6\right\}$$

$$= v\left\{\frac{1-\sigma}{(1+\sigma)} + (1-\sigma)\left[\frac{-(1+\sigma)^2}{(1+\sigma)^3} + \frac{(2+\sigma)}{(1+\sigma)^3}\right]\left(\frac{v}{C}\right)^2\right.$$

$$+(1-\sigma)\left[\frac{4(\sigma+3\sigma^2+3\sigma^3+\sigma^4)}{4(1+\sigma)^5} + \frac{(8+\sigma-30\sigma^2-19\sigma^3)}{4(1+\sigma)^5}\right]\left(\frac{v}{C}\right)^4$$

$$\left. + \frac{(28+14\sigma-85\sigma^2-14\sigma^3+88\sigma^4-8\sigma^5-31\sigma^6)}{8(1+\sigma)^6}\left(\frac{v}{C}\right)^6\right\}$$

$$= v\left\{\frac{1-\sigma}{(1+\sigma)} + (1-\sigma)\left[\frac{1-\sigma-\sigma^2}{(1+\sigma)^3}\right]\left(\frac{v}{C}\right)^2 + (1-\sigma)\left[\frac{(8+5\sigma-18\sigma^2-7\sigma^3+4\sigma^4)}{4(1+\sigma)^5}\right]\left(\frac{v}{C}\right)^4\right.$$

$$\left. + \frac{(28+14\sigma-85\sigma^2-14\sigma^3+88\sigma^4-8\sigma^5-31\sigma^6)}{8(1+\sigma)^6}\left(\frac{v}{C}\right)^6\right\}$$

While the front factor $\frac{v}{C_x C_{-x}}$ is

$$\frac{v}{C_x C_{-x}} = \frac{v}{\left[C + \frac{(-1)}{(1+\sigma)}v + \frac{1}{C(1+\sigma)^2}v^2 + \frac{(-2-\sigma)(1-\sigma)}{2C^2(1+\sigma)^3}v^3 + \frac{(1-\sigma-\sigma^2)}{C^3(1+\sigma)^4}v^4 + \cdots\right]\left[C + \frac{1}{(1+\sigma)}v + \frac{1}{C(1+\sigma)^2}v^2 + \frac{(2+\sigma)(1-\sigma)}{2C^2(1+\sigma)^3}v^3 + \frac{(1-\sigma-\sigma^2)}{C^3(1+\sigma)^4}v^4 + \cdots\right]}$$

Now we find out the denominator as below (neglect more higher order infinitely small than $(v/C)^6$)

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| $\times$ | $C$ | $\frac{-v}{1+\sigma}$ | $\frac{v^2}{C\cdot(1+\sigma)^2}$ | $\frac{(-2-\sigma)(1-\sigma)v^3}{2C^2\cdot(1+\sigma)^3}$ | $\frac{(1-\sigma-\sigma^2)v^4}{C^3\cdot(1+\sigma)^4}$ | $\frac{-v^5(1-\sigma)(8+\sigma-30\cdot\sigma^2-19\sigma^3)}{8C^4\cdot(1+\sigma)^5}$ | $\frac{(4\sigma^2-3\sigma^3-26\sigma^4+13\sigma^5+20\sigma^6)v^6}{4C^5\cdot(1+\sigma)^6}$ |
| $C$ | $C^2$ | $\frac{-Cv}{1+\sigma}$ | $\frac{v^2}{(1+\sigma)^2}$ | $\frac{(-2-\sigma)(1-\sigma)v^3}{2C\cdot(1+\sigma)^3}$ | $\frac{(1-\sigma-\sigma^2)v^4}{C^2\cdot(1+\sigma)^4}$ | $\frac{-v^5(1-\sigma)(8+\sigma-30\cdot\sigma^2-19\sigma^3)}{8C^3\cdot(1+\sigma)^5}$ | $\frac{(4\sigma^2-3\sigma^3-26\sigma^4+13\sigma^5+20\sigma^6)v^6}{4C^4\cdot(1+\sigma)^6}$ |
| $\frac{v}{1+\sigma}$ | $\frac{Cv}{1+\sigma}$ | $\frac{-v^2}{(1+\sigma)^2}$ | $\frac{v^3}{C\cdot(1+\sigma)^3}$ | $\frac{(-2-\sigma)(1-\sigma)v^4}{2C^2\cdot(1+\sigma)^4}$ | $\frac{(1-\sigma-\sigma^2)v^5}{C^3\cdot(1+\sigma)^5}$ | $\frac{-v^6(1-\sigma)(8+\sigma-30\cdot\sigma^2-19\sigma^3)}{8C^4\cdot(1+\sigma)^6}$ | |
| $\frac{v^2}{C\cdot(1+\sigma)^2}$ | $\frac{v^2}{(1+\sigma)^2}$ | $\frac{-v^3}{C\cdot(1+\sigma)^3}$ | $\frac{v^4}{C^2\cdot(1+\sigma)^4}$ | $\frac{(-2-\sigma)(1-\sigma)v^5}{2C^3\cdot(1+\sigma)^5}$ | $\frac{(1-\sigma-\sigma^2)v^6}{C^4\cdot(1+\sigma)^6}$ | | |
| $\frac{(2+\sigma)(1-\sigma)v^3}{2C^2\cdot(1+\sigma)^3}$ | $\frac{(2+\sigma)(1-\sigma)v^3}{2C\cdot(1+\sigma)^3}$ | $\frac{(-2-\sigma)(1-\sigma)v^4}{2C^2\cdot(1+\sigma)^4}$ | $\frac{(2+\sigma)(1-\sigma)v^5}{2C^3\cdot(1+\sigma)^5}$ | $\frac{-(2+\sigma)^2(1-\sigma)^2v^6}{4C^4\cdot(1+\sigma)^6}$ | | | |
| $\frac{(1-\sigma-\sigma^2)v^4}{C^3\cdot(1+\sigma)^4}$ | $\frac{(1-\sigma-\sigma^2)v^4}{C^2\cdot(1+\sigma)^4}$ | $\frac{-(1-\sigma-\sigma^2)v^5}{C^3\cdot(1+\sigma)^5}$ | $\frac{(1-\sigma-\sigma^2)v^6}{C^4\cdot(1+\sigma)^6}$ | | | | |
| $\frac{v^5(1-\sigma)(8+\sigma-30\cdot\sigma^2-19\sigma^3)}{8C^4\cdot(1+\sigma)^5}$ | $\frac{v^5(1-\sigma)(8+\sigma-30\cdot\sigma^2-19\sigma^3)}{8C^3\cdot(1+\sigma)^5}$ | $\frac{-v^6(1-\sigma)(8+\sigma-30\cdot\sigma^2-19\sigma^3)}{8C^4\cdot(1+\sigma)^6}$ | | | | | |
| $\frac{(4\sigma^2-3\sigma^3-26\sigma^4+13\sigma^5+20\sigma^6)v^6}{4C^5\cdot(1+\sigma)^6}$ | $\frac{(4\sigma^2-3\sigma^3-26\sigma^4+13\sigma^5+20\sigma^6)v^6}{4C^4\cdot(1+\sigma)^6}$ | | | | | | |

We can see 2 $v$-term of the $C_xC_{-x}$ counteracted, 4 $v^3$-term of the $C_xC_{-x}$ counteracted and 6 $v^5$-term of the $C_xC_{-x}$ counteracted, then we can get the $\frac{v}{C_xC_{-x}}$ is

$$\frac{v}{C^2+0v+\frac{v^2}{(1+\sigma)^2}+0v^3+\left[\frac{1}{C^2(1+\sigma)^4}+2\times\frac{(-2-\sigma)(1-\sigma)}{2C^2(1+\sigma)^4}+2\times\frac{(1-\sigma-\sigma^2)}{C^2(1+\sigma)^4}\right]v^4+0v^5+\left[\frac{-(2+\sigma)^2(1-\sigma)^2}{4C^4(1+\sigma)^6}+2\times\frac{(1-\sigma-\sigma^2)}{C^4(1+\sigma)^6}+2\times\frac{-(1-\sigma)(8+\sigma-30\sigma^2-19\sigma^3)}{8C^4(1+\sigma)^6}+2\times\frac{(4\sigma^2-3\sigma^3-26\sigma^4+13\sigma^5+20\sigma^6)}{4C^4(1+\sigma)^6}\right]v^6+\cdots}=$$

$$\frac{v}{C^2}\cdot\frac{1}{\left[1+\frac{1}{(1+\sigma)^2}\left(\frac{v}{C}\right)^2+\frac{(1-\sigma-\sigma^2)}{(1+\sigma)^4}\left(\frac{v}{C}\right)^4+\frac{(-4+3\sigma+34\sigma^2-19\sigma^3-72\sigma^4+26\sigma^5+40\sigma^6)}{4C^4(1+\sigma)^6}\left(\frac{v}{C}\right)^6\cdots\right]}\approx$$

$$\frac{v}{C^2}\cdot\frac{1}{\left[1+\frac{1}{(1+\sigma)^2}\left(\frac{v}{C}\right)^2+\frac{(1-\sigma-\sigma^2)}{(1+\sigma)^4}\left(\frac{v}{C}\right)^4+\frac{(-4+3\sigma+34\sigma^2-19\sigma^3-72\sigma^4+26\sigma^5+40\sigma^6)}{4C^4(1+\sigma)^6}\left(\frac{v}{C}\right)^6\right]}$$

$$\approx$$

$$\frac{v}{C^2}\cdot\left[1-\frac{1}{(1+\sigma)^2}\left(\frac{v}{C}\right)^2-\frac{(1-\sigma-\sigma^2)}{(1+\sigma)^4}\left(\frac{v}{C}\right)^4-\frac{(-4+3\sigma+34\sigma^2-19\sigma^3-72\sigma^4+26\sigma^5+40\sigma^6)}{4C^4(1+\sigma)^6}\left(\frac{v}{C}\right)^6\right]$$

(taking note of that $\frac{1}{(1\pm x)^\gamma}=1\mp\gamma\cdot x+\cdots$, and taking the $\frac{1}{(1+\sigma)^2}\left(\frac{v}{C}\right)^2+\frac{(1-\sigma-\sigma^2)}{(1+\sigma)^4}\left(\frac{v}{C}\right)^4+\frac{(-4+3\sigma+34\sigma^2-19\sigma^3-72\sigma^4+26\sigma^5+40\sigma^6)}{4C^4(1+\sigma)^6}\left(\frac{v}{C}\right)^6$ as the $x$). Then we can get (neglect more higher order infinitely small than $(v/C)^6$)

$$\lambda=\frac{(-v+C_{-x}\varphi_3)(v+C_x\varphi_3)}{C_xC_{-x}\varphi_3}=\frac{v}{C_xC_{-x}}\left[\frac{(-v)}{\varphi_3}+C_{-x}-C_x\right]+\varphi_3$$

$$\approx \frac{v}{C^2}\cdot\left[1-\frac{1}{(1+\sigma)^2}\left(\frac{v}{C}\right)^2-\frac{(1-\sigma-\sigma^2)}{(1+\sigma)^4}\left(\frac{v}{C}\right)^4-\frac{(-4+3\sigma+34\sigma^2-19\sigma^3-72\sigma^4+26\sigma^5+40\sigma^6)}{4C^4(1+\sigma)^6}\left(\frac{v}{C}\right)^6\right]\times$$

$$v\left[\frac{1-\sigma}{(1+\sigma)}+(1-\sigma)\frac{(1-\sigma-\sigma^2)}{(1+\sigma)^3}\left(\frac{v}{C}\right)^2+(1-\sigma)\frac{(8+5\sigma-18\sigma^2-7\sigma^3+4\sigma^4)}{4(1+\sigma)^5}\left(\frac{v}{C}\right)^4\right.$$

$$\left.+\frac{(28+14\sigma-85\sigma^2-14\sigma^3+88\sigma^4-8\sigma^5-31\sigma^6)}{8(1+\sigma)^6}\left(\frac{v}{C}\right)^6\right]+\varphi_3$$

$$=\frac{v^2}{C^2}\left[1-\frac{1}{(1+\sigma)^2}\left(\frac{v}{C}\right)^2-\frac{(1-\sigma-\sigma^2)}{(1+\sigma)^4}\left(\frac{v}{C}\right)^4-\frac{(-4+3\sigma+34\sigma^2-19\sigma^3-72\sigma^4+26\sigma^5+40\sigma^6)}{4C^4(1+\sigma)^6}\left(\frac{v}{C}\right)^6\right]\times$$

$$\left[\frac{1-\sigma}{(1+\sigma)}+(1-\sigma)\frac{(1-\sigma-\sigma^2)}{(1+\sigma)^3}\left(\frac{v}{C}\right)^2+(1-\sigma)\frac{(8+5\sigma-18\sigma^2-7\sigma^3+4\sigma^4)}{4(1+\sigma)^5}\left(\frac{v}{C}\right)^4\right.$$

$$\left.+\frac{(28+14\sigma-85\sigma^2-14\sigma^3+88\sigma^4-8\sigma^5-31\sigma^6)}{8(1+\sigma)^6}\left(\frac{v}{C}\right)^6\right]+\varphi_3$$

≈(neglect more higher order infinitely small than $(v/C)^6$)

$$\frac{v^2}{C^2}\cdot\left[\frac{1-\sigma}{(1+\sigma)}-\frac{(1-\sigma)}{(1+\sigma)^3}\left(\frac{v}{C}\right)^2-\frac{(1-\sigma)(1-\sigma-\sigma^2)}{(1+\sigma)^5}\left(\frac{v}{C}\right)^4\right.$$

$$-\frac{(1-\sigma)(-4+3\sigma+34\sigma^2-19\sigma^3-72\sigma^4+26\sigma^5+40\sigma^6)}{4C^4(1+\sigma)^7}\left(\frac{v}{C}\right)^6$$

$$+\frac{(1-\sigma)(1-\sigma-\sigma^2)}{(1+\sigma)^3}\left(\frac{v}{C}\right)^2-\frac{(1-\sigma)(1-\sigma-\sigma^2)}{(1+\sigma)^3}\frac{1}{(1+\sigma)^2}\left(\frac{v}{C}\right)^4-\frac{(1-\sigma)(1-\sigma-\sigma^2)}{(1+\sigma)^3}\frac{(1-\sigma-\sigma^2)}{(1+\sigma)^4}\left(\frac{v}{C}\right)^6=$$

$$+\frac{(1-\sigma)(8+5\sigma-18\sigma^2-7\sigma^3+4\sigma^4)}{4(1+\sigma)^5}\left(\frac{v}{C}\right)^4-\frac{(1-\sigma)(8+5\sigma-18\sigma^2-7\sigma^3+4\sigma^4)}{4(1+\sigma)^5}\frac{1}{(1+\sigma)^2}\left(\frac{v}{C}\right)^6$$

$$\left.+\frac{(28+14\sigma-85\sigma^2-14\sigma^3+88\sigma^4-8\sigma^5-31\sigma^6)}{8(1+\sigma)^6}\left(\frac{v}{C}\right)^6\right]+\varphi_3$$

$$\frac{v^2}{C^2}\cdot\left[\frac{1-\sigma}{(1+\sigma)}+\frac{(1-\sigma)(-\sigma-\sigma^2)}{(1+\sigma)^3}\left(\frac{v}{C}\right)^2+\frac{(1-\sigma)(+13\sigma-10\sigma^2-7\sigma^3+4\sigma^4)}{4(1+\sigma)^5}\left(\frac{v}{C}\right)^4\right.$$

$$-\frac{(1-\sigma)(-4+3\sigma+34\sigma^2-19\sigma^3-72\sigma^4+26\sigma^5+40\sigma^6)}{4C^4(1+\sigma)^7}\left(\frac{v}{C}\right)^6$$

$$-\frac{(1-\sigma)(1-\sigma-\sigma^2)}{(1+\sigma)^3}\frac{(1-\sigma-\sigma^2)}{(1+\sigma)^4}\left(\frac{v}{C}\right)^6 \qquad =$$

$$-\frac{(1-\sigma)(8+5\sigma-18\sigma^2-7\sigma^3+4\sigma^4)}{4(1+\sigma)^5}\frac{1}{(1+\sigma)^2}\left(\frac{v}{C}\right)^6$$

$$\left.+\frac{(28+14\sigma-85\sigma^2-14\sigma^3+88\sigma^4-8\sigma^5-31\sigma^6)}{8(1+\sigma)^6}\left(\frac{v}{C}\right)^6\right]+\varphi_3$$

≈(neglect more higher order infinitely small than $(v/C)^6$)

$$\frac{v^2}{C^2}\left[\frac{1-\sigma}{(1+\sigma)}+\frac{(1-\sigma)(-\sigma-\sigma^2)}{(1+\sigma)^3}\left(\frac{v}{C}\right)^2+\frac{(1-\sigma)(+13\sigma-10\sigma^2-7\sigma^3+4\sigma^4)}{4(1+\sigma)^5}\left(\frac{v}{C}\right)^4\right]+\varphi_3$$

$$=\frac{v^2}{C^2}\left[\frac{1-\sigma}{(1+\sigma)}+\frac{(1-\sigma)(-\sigma-\sigma^2)}{(1+\sigma)^3}\left(\frac{v}{C}\right)^2+\frac{(1-\sigma)(+13\sigma-10\sigma^2-7\sigma^3+4\sigma^4)}{4(1+\sigma)^5}\left(\frac{v}{C}\right)^4\right]$$

$$+1+0+\frac{(\sigma-1)}{(1+\sigma)}\left(\frac{v}{C}\right)^2+0+\frac{\sigma(1+\sigma-\sigma^2-\sigma^3)}{(1+\sigma)^4}\left(\frac{v}{C}\right)^4+0$$

$$+\frac{(28+14\sigma-85\sigma^2-14\sigma^3+88\sigma^4-8\sigma^5-31\sigma^6)}{8(1+\sigma)^6}\left(\frac{v}{C}\right)^6+\cdots\cdots$$

=

$$1+\left[\frac{(1-\sigma)(+13\sigma-10\sigma^2-7\sigma^3+4\sigma^4)}{4(1+\sigma)^5}+\frac{(28+14\sigma-85\sigma^2-14\sigma^3+88\sigma^4-8\sigma^5-31\sigma^6)}{8(1+\sigma)^6}\right]\left(\frac{v}{C}\right)^6+\cdots\cdots=$$

$$1+\left[\frac{(+26\sigma-20\sigma^2-40\sigma^3+28\sigma^4+14\sigma^5-8\sigma^6)}{8(1+\sigma)^6}+\frac{(28+14\sigma-85\sigma^2-14\sigma^3+88\sigma^4-8\sigma^5-31\sigma^6)}{8(1+\sigma)^6}\right]\left(\frac{v}{C}\right)^6 \quad =$$

$+\cdots\cdots$

$$1+\frac{(28+40\sigma-105\sigma^2-54\sigma^3+116\sigma^4+6\sigma^5-39\sigma^6)}{8(1+\sigma)^6}\left(\frac{v}{C}\right)^6+\cdots\cdots$$

$$\approx 1+\frac{(28+40\sigma-105\sigma^2-54\sigma^3+116\sigma^4+6\sigma^5-39\sigma^6)}{8(1+\sigma)^6}\left(\frac{v}{C}\right)^6$$

(neglect more higher order infinitely small than $(v/C)^6$)

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