```
CoefficientRules[Series[e^(a x), {x, 0, 3}], a]
```

$$\left\{\{0\} \to 1 + a\,x + \frac{a^2 x^2}{2} + \frac{a^3 x^3}{6} + O[x]^4\right\}$$

```
Series[e^((a+b) x), {x, 0, 3}]
```

$$1 + (a+b)\,x + \frac{1}{2}(a+b)^2 x^2 + \frac{1}{6}(a+b)^3 x^3 + O[x]^4$$

```
Series[e^((a+b) x), {x, 0, 3}] // Expand
```

$$1 + (a+b)\,x + \frac{1}{2}(a+b)^2 x^2 + \frac{1}{6}(a+b)^3 x^3 + O[x]^4$$

```
Series[e^((a+b) x), {x, 0, 3}] // FullForm
```

```
SeriesData[x, 0, List[1, Plus[a, b], Times[Rational[1, 2], Power[Plus[a, b], 2]],
  Times[Rational[1, 6], Power[Plus[a, b], 3]]], 0, 4, 1]
```

```
? MapAt
```

MapAt[f, $expr$, n] applies f to the element at position n in $expr$. If n is negative, the position is counted from the end.

MapAt[f, $expr$, {i, j, …}] applies f to the part of $expr$ at position {i, j, …}.

MapAt[f, $expr$, {{i_1, j_1, …}, {i_2, j_2, …}, …}] applies f to parts of $expr$ at several positions.

MapAt[f, pos] represents an operator form of MapAt that can be applied to an expression. ≫

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CΦ
```

$$\text{Œ}_{CU}\Big[\{y_1, a_1, x_1\}_1, \{y_2, a_2, x_2\}_2, \{y_3, a_3, x_3\}_3,$$
$$\hbar\,\big(x_1 y_1 \gamma_{11} + x_2 y_1 \gamma_{12} + x_3 y_1 \gamma_{13} + x_1 y_2 \gamma_{21} + x_2 y_2 \gamma_{22} + x_3 y_2 \gamma_{23} +$$
$$x_1 y_3 \gamma_{31} + x_2 y_3 \gamma_{32} + x_3 y_3 \gamma_{33} + a_1 t_1 \lambda_{11} + a_2 t_1 \lambda_{12} + a_3 t_1 \lambda_{13} + a_1 t_2 \lambda_{21} +$$
$$a_2 t_2 \lambda_{22} + a_3 t_2 \lambda_{23} + a_1 t_3 \lambda_{31} + a_2 t_3 \lambda_{32} + a_3 t_3 \lambda_{33}\big),\ 1 + O[\epsilon]^2\Big]$$

```
CΦ // m1,2→1
```

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$$\Big\{\{\{x_1, \upsilon\$4985\}, \{y_2, \omega\$4985\}\},\ 1 + O[\epsilon]^2,$$
$$\frac{1}{1+\delta\$4985\,t_2}\, e^{\frac{-\upsilon\$4985\,\omega\$4985\,t_2 + \upsilon\$4985\,x_{n\$4985} + \omega\$4985\,y_{n\$4985} + \delta\$4985\,x_{n\$4985}\,y_{n\$4985}}{1+\delta\$4985\,t_2}} + \Big(e^{\frac{-\upsilon\$4985\,\omega\$4985\,t_2 + \upsilon\$4985\,x_{n\$4985} + \omega\$4985\,y_{n\$4985} + \delta\$4985\,x_{n\$4985}\,y_{n\$4985}}{1+\delta\$4985\,t_2}}$$
$$\big(4\,\upsilon\$4985\,\omega\$4985\,a_{n\$4985} + \gamma\,\upsilon\$4985^2\,\omega\$4985^2\,t_2 - 2\,\gamma\,\upsilon\$4985^2\,\omega\$4985\,x_{n\$4985} - 2\,\gamma\,\upsilon\$4985\,\omega\$4985^2\,y_{n\$4985}\big)$$
$$\epsilon\Big) \Big/ \big(2\,(1+\delta\$4985\,t_2)\big) + \frac{1}{24\,(1+\delta\$4985\,t_2)}\, e^{\frac{-\upsilon\$4985\,\omega\$4985\,t_2 + \upsilon\$4985\,x_{n\$4985} + \omega\$4985\,y_{n\$4985} + \delta\$4985\,x_{n\$4985}\,y_{n\$4985}}{1+\delta\$4985\,t_2}}$$
$$\big(-24\,\gamma\,\upsilon\$4985^2\,\omega\$4985^2\,a_{n\$4985} + 48\,\upsilon\$4985^2\,\omega\$4985^2\,a_{n\$4985}^2 - 8\,\gamma^2\,\upsilon\$4985^3\,\omega\$4985^3\,t_2 +$$
$$24\,\gamma\,\upsilon\$4985^3\,\omega\$4985^3\,a_{n\$4985}\,t_2 + 3\,\gamma^2\,\upsilon\$4985^4\,\omega\$4985^4\,t_2^2 + 24\,\gamma^2\,\upsilon\$4985^3\,\omega\$4985^2\,x_{n\$4985} -$$
$$48\,\gamma\,\upsilon\$4985^3\,\omega\$4985^2\,a_{n\$4985}\,x_{n\$4985} - 12\,\gamma^2\,\upsilon\$4985^4\,\omega\$4985^3\,t_2\,x_{n\$4985} + 12\,\gamma^2\,\upsilon\$4985^4\,\omega\$4985^2\,x_{n\$4985}^2 +$$
$$24\,\gamma^2\,\upsilon\$4985^2\,\omega\$4985^3\,y_{n\$4985} - 48\,\gamma\,\upsilon\$4985^2\,\omega\$4985^3\,a_{n\$4985}\,y_{n\$4985} - 12\,\gamma^2\,\upsilon\$4985^3\,\omega\$4985^4\,t_2\,y_{n\$4985} +$$
$$24\,\gamma^2\,\upsilon\$4985^3\,\omega\$4985^3\,x_{n\$4985}\,y_{n\$4985} + 12\,\gamma^2\,\upsilon\$4985^2\,\omega\$4985^4\,y_{n\$4985}^2\big)\,\epsilon^2 + O[\epsilon]^3\Big\}$$

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$$\mathbb{E}_{CU}\Big[\{y_3, a_3, x_3\}_3, \{y_1, a_1, y_{\$133}, a_{\$133}, x_{\$133}, a_2, x_2\}_2,$$

$$\frac{1}{1+\hbar t_2 \gamma_{21}}\Big(\hbar x_{\$133} y_1 \gamma_{11} + \hbar x_2 y_1 \gamma_{12} + \hbar x_3 y_1 \gamma_{13} + \hbar x_{\$133} y_{\$133} \gamma_{21} + \hbar^2 t_2 x_2 y_1 \gamma_{12} \gamma_{21} +$$
$$\hbar^2 t_2 x_3 y_1 \gamma_{13} \gamma_{21} + \hbar x_2 y_{\$133} \gamma_{22} - \hbar^2 t_2 x_2 y_1 \gamma_{11} \gamma_{22} + \hbar x_3 y_{\$133} \gamma_{23} - \hbar^2 t_2 x_3 y_1 \gamma_{11} \gamma_{23} +$$
$$\hbar x_{\$133} y_3 \gamma_{31} - \hbar^2 t_2 x_2 y_3 \gamma_{22} \gamma_{31} - \hbar^2 t_2 x_3 y_3 \gamma_{23} \gamma_{31} + \hbar x_2 y_3 \gamma_{32} + \hbar^2 t_2 x_2 y_3 \gamma_{21} \gamma_{32} + \hbar x_3 y_3 \gamma_{33} +$$
$$\hbar^2 t_2 x_3 y_3 \gamma_{21} \gamma_{33} + \hbar a_1 t_2 \lambda_{11} + \hbar^2 a_1 t_2^2 \gamma_{21} \lambda_{11} + \hbar a_2 t_2 \lambda_{12} + \hbar^2 a_2 t_2^2 \gamma_{21} \lambda_{12} + \hbar a_3 t_2 \lambda_{13} +$$
$$\hbar^2 a_3 t_2^2 \gamma_{21} \lambda_{13} + \hbar a_1 t_2 \lambda_{21} + \hbar^2 a_1 t_2^2 \gamma_{21} \lambda_{21} + \hbar a_2 t_2 \lambda_{22} + \hbar^2 a_2 t_2^2 \gamma_{21} \lambda_{22} + \hbar a_3 t_2 \lambda_{23} + \hbar^2 a_3 t_2^2 \gamma_{21} \lambda_{23} +$$
$$\hbar a_1 t_3 \lambda_{31} + \hbar^2 a_1 t_2 t_3 \gamma_{21} \lambda_{31} + \hbar a_2 t_3 \lambda_{32} + \hbar^2 a_2 t_2 t_3 \gamma_{21} \lambda_{32} + \hbar a_3 t_3 \lambda_{33} + \hbar^2 a_3 t_2 t_3 \gamma_{21} \lambda_{33}\Big),$$

$$\frac{1}{1+\hbar t_2 \gamma_{21}} + \frac{1}{2\,(1+\hbar t_2 \gamma_{21})}\Big(4 \hbar^2 a_{\$133} x_2 y_1 \gamma_{11} \gamma_{22} - 2 \gamma \hbar^3 x_2 x_{\$133} y_1^2 \gamma_{11}^2 \gamma_{22} - 2 \gamma \hbar^3 x_2^2 y_1 y_{\$133} \gamma_{11} \gamma_{22}^2 +$$
$$\gamma \hbar^4 t_2 x_2^2 y_1^2 \gamma_{11}^2 \gamma_{22}^2 + 4 \hbar^2 a_{\$133} x_3 y_1 \gamma_{11} \gamma_{23} - 2 \gamma \hbar^3 x_3 x_{\$133} y_1^2 \gamma_{11}^2 \gamma_{23} - 4 \gamma \hbar^3 x_2 x_3 y_1 y_{\$133} \gamma_{11} \gamma_{22} \gamma_{23} +$$
$$2 \gamma \hbar^4 t_2 x_2 x_3 y_1^2 \gamma_{11}^2 \gamma_{22} \gamma_{23} - 2 \gamma \hbar^3 x_3^2 y_1 y_{\$133} \gamma_{11} \gamma_{23}^2 + \gamma \hbar^4 t_2 x_3^2 y_1^2 \gamma_{11}^2 \gamma_{23}^2 + 4 \hbar^2 a_{\$133} x_2 y_3 \gamma_{22} \gamma_{31} -$$
$$4 \gamma \hbar^3 x_2 x_{\$133} y_1 y_3 \gamma_{11} \gamma_{22} \gamma_{31} - 2 \gamma \hbar^3 x_2^2 y_3 y_{\$133} \gamma_{22}^2 \gamma_{31} + 2 \gamma \hbar^4 t_2 x_2^2 y_1 y_3 \gamma_{11} \gamma_{22}^2 \gamma_{31} + 4 \hbar^2 a_{\$133} x_3 y_3 \gamma_{23}$$
$$\gamma_{31} - 4 \gamma \hbar^3 x_3 x_{\$133} y_1 y_3 \gamma_{11} \gamma_{23} \gamma_{31} - 4 \gamma \hbar^3 x_2 x_3 y_3 y_{\$133} \gamma_{22} \gamma_{23} \gamma_{31} + 4 \gamma \hbar^4 t_2 x_2 x_3 y_1 y_3 \gamma_{11} \gamma_{22} \gamma_{23} \gamma_{31} -$$
$$2 \gamma \hbar^3 x_3^2 y_3 y_{\$133} \gamma_{23}^2 \gamma_{31} + 2 \gamma \hbar^4 t_2 x_3^2 y_1 y_3 \gamma_{11} \gamma_{23}^2 \gamma_{31} - 2 \gamma \hbar^3 x_2 x_{\$133} y_3^2 \gamma_{22} \gamma_{31}^2 + \gamma \hbar^4 t_2 x_2^2 y_3^2 \gamma_{22}^2 \gamma_{31}^2 -$$
$$2 \gamma \hbar^3 x_3 x_{\$133} y_3^2 \gamma_{23} \gamma_{31}^2 + 2 \gamma \hbar^4 t_2 x_2 x_3 y_3^2 \gamma_{22} \gamma_{23} \gamma_{31}^2 + \gamma \hbar^4 t_2 x_3^2 y_3^2 \gamma_{23}^2 \gamma_{31}^2\Big) \in + O[\in]^2\Big]$$

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$$\Big\{\Big\{\{a_1, \upsilon\$5048\}, \{y_{\$133}, \omega\$5048\}\Big\},$$

$$\frac{1}{1+\hbar t_2 \gamma_{21}} + \frac{1}{2\,(1+\hbar t_2 \gamma_{21})}\Big(4 \hbar^2 a_{\$133} x_2 y_1 \gamma_{11} \gamma_{22} - 2 \gamma \hbar^3 x_2 x_{\$133} y_1^2 \gamma_{11}^2 \gamma_{22} -$$
$$2 \gamma \hbar^3 x_2^2 y_1 y_{\$133} \gamma_{11} \gamma_{22}^2 + \gamma \hbar^4 t_2 x_2^2 y_1^2 \gamma_{11}^2 \gamma_{22}^2 + 4 \hbar^2 a_{\$133} x_3 y_1 \gamma_{11} \gamma_{23} - 2 \gamma \hbar^3 x_3 x_{\$133} y_1^2 \gamma_{11}^2 \gamma_{23} -$$
$$4 \gamma \hbar^3 x_2 x_3 y_1 y_{\$133} \gamma_{11} \gamma_{22} \gamma_{23} + 2 \gamma \hbar^4 t_2 x_2 x_3 y_1^2 \gamma_{11}^2 \gamma_{22} \gamma_{23} - 2 \gamma \hbar^3 x_3^2 y_1 y_{\$133} \gamma_{11} \gamma_{23}^2 +$$
$$\gamma \hbar^4 t_2 x_3^2 y_1^2 \gamma_{11}^2 \gamma_{23}^2 + 4 \hbar^2 a_{\$133} x_2 y_3 \gamma_{22} \gamma_{31} - 4 \gamma \hbar^3 x_2 x_{\$133} y_1 y_3 \gamma_{11} \gamma_{22} \gamma_{31} - 2 \gamma \hbar^3 x_2^2 y_3 y_{\$133} \gamma_{22}^2 \gamma_{31} +$$
$$2 \gamma \hbar^4 t_2 x_2^2 y_1 y_3 \gamma_{11} \gamma_{22}^2 \gamma_{31} + 4 \hbar^2 a_{\$133} x_3 y_3 \gamma_{23} \gamma_{31} - 4 \gamma \hbar^3 x_3 x_{\$133} y_1 y_3 \gamma_{11} \gamma_{23} \gamma_{31} -$$
$$4 \gamma \hbar^3 x_2 x_3 y_3 y_{\$133} \gamma_{22} \gamma_{23} \gamma_{31} + 4 \gamma \hbar^4 t_2 x_2 x_3 y_1 y_3 \gamma_{11} \gamma_{22} \gamma_{23} \gamma_{31} - 2 \gamma \hbar^3 x_3^2 y_3 y_{\$133} \gamma_{23}^2 \gamma_{31} +$$
$$2 \gamma \hbar^4 t_2 x_3^2 y_1 y_3 \gamma_{11} \gamma_{23}^2 \gamma_{31} - 2 \gamma \hbar^3 x_2 x_{\$133} y_3^2 \gamma_{22} \gamma_{31}^2 + \gamma \hbar^4 t_2 x_2^2 y_3^2 \gamma_{22}^2 \gamma_{31}^2 - 2 \gamma \hbar^3 x_3 x_{\$133} y_3^2 \gamma_{23} \gamma_{31}^2 +$$
$$2 \gamma \hbar^4 t_2 x_2 x_3 y_3^2 \gamma_{22} \gamma_{23} \gamma_{31}^2 + \gamma \hbar^4 t_2 x_3^2 y_3^2 \gamma_{23}^2 \gamma_{31}^2\Big) \in + O[\in]^2,\ e^{\upsilon\$5048\, a_{n\$5048} + e^{-\gamma\, \upsilon\$5048}\, \omega\$5048\, y_{n\$5048}} + O[\in]^3\Big\}$$

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$$
\begin{aligned}
&\mathbb{E}_{CU}\Big[\{y_3, a_3, x_3\}_3, \{y_1, y_{\$134}, a_{\$134}, a_{\$133}, x_{\$133}, a_2, x_2\}_2,\\
&\frac{1}{1+\hbar t_2 \gamma_{21}} e^{-\gamma \hbar t_2 \lambda_{11}-\gamma \hbar t_2 \lambda_{21}-\gamma \hbar t_3 \lambda_{31}} \Big(e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar x_{\$133} y_1 \gamma_{11} + e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar x_2 y_1 \gamma_{12} +\\
&e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar x_3 y_1 \gamma_{13} + \hbar x_{\$133} y_{\$134} \gamma_{21} + e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2 x_2 y_1 \gamma_{12} \gamma_{21} +\\
&e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2 x_3 y_1 \gamma_{13} \gamma_{21} + \hbar x_2 y_{\$134} \gamma_{22} - e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2 x_2 y_1 \gamma_{11} \gamma_{22} +\\
&\hbar x_3 y_{\$134} \gamma_{23} - e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2 x_3 y_1 \gamma_{11} \gamma_{23} + e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar x_{\$133} y_3 \gamma_{31} -\\
&e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2 x_2 y_3 \gamma_{22} \gamma_{31} - e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2 x_3 y_3 \gamma_{23} \gamma_{31} +\\
&e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar x_2 y_3 \gamma_{32} + e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2 x_2 y_3 \gamma_{21} \gamma_{32} +\\
&e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar x_3 y_3 \gamma_{33} + e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2 x_3 y_3 \gamma_{21} \gamma_{33} +\\
&e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar a_{\$134} t_2 \lambda_{11} + e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 a_{\$134} t_2^2 \gamma_{21} \lambda_{11} +\\
&e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar a_2 t_2 \lambda_{12} + e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 a_2 t_2^2 \gamma_{21} \lambda_{12} +\\
&e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar a_3 t_2 \lambda_{13} + e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 a_3 t_2^2 \gamma_{21} \lambda_{13} +\\
&e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar a_{\$134} t_2 \lambda_{21} + e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 a_{\$134} t_2^2 \gamma_{21} \lambda_{21} +\\
&e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar a_2 t_2 \lambda_{22} + e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 a_2 t_2^2 \gamma_{21} \lambda_{22} +\\
&e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar a_3 t_2 \lambda_{23} + e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 a_3 t_2^2 \gamma_{21} \lambda_{23} +\\
&e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar a_{\$134} t_3 \lambda_{31} + e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 a_{\$134} t_2 t_3 \gamma_{21} \lambda_{31} +\\
&e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar a_2 t_3 \lambda_{32} + e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 a_2 t_2 t_3 \gamma_{21} \lambda_{32} +\\
&e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar a_3 t_3 \lambda_{33} + e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 a_3 t_2 t_3 \gamma_{21} \lambda_{33}\Big),\\
&\frac{1}{1+\hbar t_2 \gamma_{21}} + \frac{1}{2\,(1+\hbar t_2 \gamma_{21})} e^{-\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}}\\
&\Big(4 e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}} \hbar^2 a_{\$133} x_2 y_1 \gamma_{11} \gamma_{22} -\\
&2 e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}} \gamma \hbar^3 x_2 x_{\$133} y_1^2 \gamma_{11}^2 \gamma_{22} - 2 \gamma \hbar^3 x_2^2 y_1 y_{\$134} \gamma_{11} \gamma_{22}^2 +\\
&e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}} \gamma \hbar^4 t_2 x_2^2 y_1^2 \gamma_{11}^2 \gamma_{22}^2 + 4 e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}}\\
&\hbar^2 a_{\$133} x_3 y_1 \gamma_{11} \gamma_{23} - 2 e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}} \gamma \hbar^3 x_3 x_{\$133} y_1^2 \gamma_{11}^2 \gamma_{23} -\\
&4 \gamma \hbar^3 x_2 x_3 y_1 y_{\$134} \gamma_{11} \gamma_{22} \gamma_{23} + 2 e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}} \gamma \hbar^4 t_2 x_2 x_3 y_1^2 \gamma_{11}^2 \gamma_{22} \gamma_{23} -\\
&2 \gamma \hbar^3 x_3^2 y_1 y_{\$134} \gamma_{11} \gamma_{23}^2 + e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}} \gamma \hbar^4 t_2 x_3^2 y_1^2 \gamma_{11}^2 \gamma_{23}^2 +\\
&4 e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}} \hbar^2 a_{\$133} x_2 y_3 \gamma_{22} \gamma_{31} -\\
&4 e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}} \gamma \hbar^3 x_2 x_{\$133} y_1 y_3 \gamma_{11} \gamma_{22} \gamma_{31} -\\
&2 \gamma \hbar^3 x_2^2 y_3 y_{\$134} \gamma_{22}^2 \gamma_{31} + 2 e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}} \gamma \hbar^4 t_2 x_2^2 y_1 y_3 \gamma_{11} \gamma_{22}^2 \gamma_{31} +\\
&4 e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}} \hbar^2 a_{\$133} x_3 y_3 \gamma_{23} \gamma_{31} -\\
&4 e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}} \gamma \hbar^3 x_3 x_{\$133} y_1 y_3 \gamma_{11} \gamma_{23} \gamma_{31} - 4 \gamma \hbar^3 x_2 x_3 y_3 y_{\$134} \gamma_{22} \gamma_{23} \gamma_{31} +\\
&4 e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}} \gamma \hbar^4 t_2 x_2 x_3 y_1 y_3 \gamma_{11} \gamma_{22} \gamma_{23} \gamma_{31} -\\
&2 \gamma \hbar^3 x_3^2 y_3 y_{\$134} \gamma_{23}^2 \gamma_{31} + 2 e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}} \gamma \hbar^4 t_2 x_3^2 y_1 y_3 \gamma_{11} \gamma_{23}^2 \gamma_{31} -\\
&2 e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}} \gamma \hbar^3 x_2 x_{\$133} y_3^2 \gamma_{22} \gamma_{31}^2 +\\
&e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}} \gamma \hbar^4 t_2 x_2^2 y_3^2 \gamma_{22}^2 \gamma_{31}^2 - 2 e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}}\\
&\gamma \hbar^3 x_3 x_{\$133} y_3^2 \gamma_{23} \gamma_{31}^2 + 2 e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}} \gamma \hbar^4 t_2 x_2 x_3 y_3^2 \gamma_{22} \gamma_{23} \gamma_{31}^2 +\\
&e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}} \gamma \hbar^4 t_2 x_3^2 y_3^2 \gamma_{23}^2 \gamma_{31}^2\Big) \epsilon + O[\epsilon]^2\Big]
\end{aligned}
$$

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$$\left\{\left\{\left\{y_1,\ \upsilon\$5058\right\},\ \left\{y_{\$134},\ \omega\$5058\right\}\right\},\ \frac{1}{1+\hbar\, t_2\, \gamma_{21}}+\frac{1}{2\,(1+\hbar\, t_2\, \gamma_{21})}\right.$$

$$e^{-\frac{\gamma\left(\hbar\, t_2\, \lambda_{11}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{11}+\hbar\, t_2\, \lambda_{21}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{21}+\hbar\, t_3\, \lambda_{31}+\hbar^2\, t_2\, t_3\, \gamma_{21}\, \lambda_{31}\right)}{1+\hbar\, t_2\, \gamma_{21}}}\left(4\, e^{\frac{\gamma\left(\hbar\, t_2\, \lambda_{11}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{11}+\hbar\, t_2\, \lambda_{21}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{21}+\hbar\, t_3\, \lambda_{31}+\hbar^2\, t_2\, t_3\, \gamma_{21}\, \lambda_{31}\right)}{1+\hbar\, t_2\, \gamma_{21}}}\, \hbar^2\, a_{\$133}\, x_2\, y_1\, \gamma_{11}\, \gamma_{22}-\right.$$

$$2\, e^{\frac{\gamma\left(\hbar\, t_2\, \lambda_{11}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{11}+\hbar\, t_2\, \lambda_{21}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{21}+\hbar\, t_3\, \lambda_{31}+\hbar^2\, t_2\, t_3\, \gamma_{21}\, \lambda_{31}\right)}{1+\hbar\, t_2\, \gamma_{21}}}\, \gamma\, \hbar^3\, x_2\, x_{\$133}\, y_1^2\, \gamma_{11}^2\, \gamma_{22}-2\, \gamma\, \hbar^3\, x_2^2\, y_1\, y_{\$134}\, \gamma_{11}\, \gamma_{22}^2+$$

$$e^{\frac{\gamma\left(\hbar\, t_2\, \lambda_{11}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{11}+\hbar\, t_2\, \lambda_{21}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{21}+\hbar\, t_3\, \lambda_{31}+\hbar^2\, t_2\, t_3\, \gamma_{21}\, \lambda_{31}\right)}{1+\hbar\, t_2\, \gamma_{21}}}\, \gamma\, \hbar^4\, t_2\, x_2^2\, y_1^2\, \gamma_{11}^2\, \gamma_{22}^2+4\, e^{\frac{\gamma\left(\hbar\, t_2\, \lambda_{11}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{11}+\hbar\, t_2\, \lambda_{21}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{21}+\hbar\, t_3\, \lambda_{31}+\hbar^2\, t_2\, t_3\, \gamma_{21}\, \lambda_{31}\right)}{1+\hbar\, t_2\, \gamma_{21}}}$$

$$\hbar^2\, a_{\$133}\, x_3\, y_1\, \gamma_{11}\, \gamma_{23}-2\, e^{\frac{\gamma\left(\hbar\, t_2\, \lambda_{11}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{11}+\hbar\, t_2\, \lambda_{21}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{21}+\hbar\, t_3\, \lambda_{31}+\hbar^2\, t_2\, t_3\, \gamma_{21}\, \lambda_{31}\right)}{1+\hbar\, t_2\, \gamma_{21}}}\, \gamma\, \hbar^3\, x_3\, x_{\$133}\, y_1^2\, \gamma_{11}^2\, \gamma_{23}-$$

$$4\, \gamma\, \hbar^3\, x_2\, x_3\, y_1\, y_{\$134}\, \gamma_{11}\, \gamma_{22}\, \gamma_{23}+2\, e^{\frac{\gamma\left(\hbar\, t_2\, \lambda_{11}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{11}+\hbar\, t_2\, \lambda_{21}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{21}+\hbar\, t_3\, \lambda_{31}+\hbar^2\, t_2\, t_3\, \gamma_{21}\, \lambda_{31}\right)}{1+\hbar\, t_2\, \gamma_{21}}}\, \gamma\, \hbar^4\, t_2\, x_2\, x_3\, y_1^2\, \gamma_{11}^2\, \gamma_{22}\, \gamma_{23}-$$

$$2\, \gamma\, \hbar^3\, x_3^2\, y_1\, y_{\$134}\, \gamma_{11}\, \gamma_{23}^2+e^{\frac{\gamma\left(\hbar\, t_2\, \lambda_{11}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{11}+\hbar\, t_2\, \lambda_{21}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{21}+\hbar\, t_3\, \lambda_{31}+\hbar^2\, t_2\, t_3\, \gamma_{21}\, \lambda_{31}\right)}{1+\hbar\, t_2\, \gamma_{21}}}\, \gamma\, \hbar^4\, t_2\, x_3^2\, y_1^2\, \gamma_{11}^2\, \gamma_{23}^2+$$

$$4\, e^{\frac{\gamma\left(\hbar\, t_2\, \lambda_{11}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{11}+\hbar\, t_2\, \lambda_{21}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{21}+\hbar\, t_3\, \lambda_{31}+\hbar^2\, t_2\, t_3\, \gamma_{21}\, \lambda_{31}\right)}{1+\hbar\, t_2\, \gamma_{21}}}\, \hbar^2\, a_{\$133}\, x_2\, y_3\, \gamma_{22}\, \gamma_{31}-$$

$$4\, e^{\frac{\gamma\left(\hbar\, t_2\, \lambda_{11}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{11}+\hbar\, t_2\, \lambda_{21}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{21}+\hbar\, t_3\, \lambda_{31}+\hbar^2\, t_2\, t_3\, \gamma_{21}\, \lambda_{31}\right)}{1+\hbar\, t_2\, \gamma_{21}}}\, \gamma\, \hbar^3\, x_2\, x_{\$133}\, y_1\, y_3\, \gamma_{11}\, \gamma_{22}\, \gamma_{31}-$$

$$2\, \gamma\, \hbar^3\, x_2^2\, y_3\, y_{\$134}\, \gamma_{22}^2\, \gamma_{31}+2\, e^{\frac{\gamma\left(\hbar\, t_2\, \lambda_{11}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{11}+\hbar\, t_2\, \lambda_{21}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{21}+\hbar\, t_3\, \lambda_{31}+\hbar^2\, t_2\, t_3\, \gamma_{21}\, \lambda_{31}\right)}{1+\hbar\, t_2\, \gamma_{21}}}\, \gamma\, \hbar^4\, t_2\, x_2^2\, y_1\, y_3\, \gamma_{11}\, \gamma_{22}^2\, \gamma_{31}+$$

$$4\, e^{\frac{\gamma\left(\hbar\, t_2\, \lambda_{11}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{11}+\hbar\, t_2\, \lambda_{21}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{21}+\hbar\, t_3\, \lambda_{31}+\hbar^2\, t_2\, t_3\, \gamma_{21}\, \lambda_{31}\right)}{1+\hbar\, t_2\, \gamma_{21}}}\, \hbar^2\, a_{\$133}\, x_3\, y_3\, \gamma_{23}\, \gamma_{31}-$$

$$4\, e^{\frac{\gamma\left(\hbar\, t_2\, \lambda_{11}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{11}+\hbar\, t_2\, \lambda_{21}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{21}+\hbar\, t_3\, \lambda_{31}+\hbar^2\, t_2\, t_3\, \gamma_{21}\, \lambda_{31}\right)}{1+\hbar\, t_2\, \gamma_{21}}}\, \gamma\, \hbar^3\, x_3\, x_{\$133}\, y_1\, y_3\, \gamma_{11}\, \gamma_{23}\, \gamma_{31}-4\, \gamma\, \hbar^3\, x_2\, x_3\, y_3\, y_{\$134}\, \gamma_{22}\, \gamma_{23}\, \gamma_{31}+$$

$$4\, e^{\frac{\gamma\left(\hbar\, t_2\, \lambda_{11}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{11}+\hbar\, t_2\, \lambda_{21}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{21}+\hbar\, t_3\, \lambda_{31}+\hbar^2\, t_2\, t_3\, \gamma_{21}\, \lambda_{31}\right)}{1+\hbar\, t_2\, \gamma_{21}}}\, \gamma\, \hbar^4\, t_2\, x_2\, x_3\, y_1\, y_3\, \gamma_{11}\, \gamma_{22}\, \gamma_{23}\, \gamma_{31}-$$

$$2\, \gamma\, \hbar^3\, x_3^2\, y_3\, y_{\$134}\, \gamma_{23}^2\, \gamma_{31}+2\, e^{\frac{\gamma\left(\hbar\, t_2\, \lambda_{11}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{11}+\hbar\, t_2\, \lambda_{21}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{21}+\hbar\, t_3\, \lambda_{31}+\hbar^2\, t_2\, t_3\, \gamma_{21}\, \lambda_{31}\right)}{1+\hbar\, t_2\, \gamma_{21}}}\, \gamma\, \hbar^4\, t_2\, x_3^2\, y_1\, y_3\, \gamma_{11}\, \gamma_{23}^2\, \gamma_{31}-$$

$$2\, e^{\frac{\gamma\left(\hbar\, t_2\, \lambda_{11}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{11}+\hbar\, t_2\, \lambda_{21}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{21}+\hbar\, t_3\, \lambda_{31}+\hbar^2\, t_2\, t_3\, \gamma_{21}\, \lambda_{31}\right)}{1+\hbar\, t_2\, \gamma_{21}}}\, \gamma\, \hbar^3\, x_2\, x_{\$133}\, y_3^2\, \gamma_{22}\, \gamma_{31}^2+$$

$$e^{\frac{\gamma\left(\hbar\, t_2\, \lambda_{11}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{11}+\hbar\, t_2\, \lambda_{21}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{21}+\hbar\, t_3\, \lambda_{31}+\hbar^2\, t_2\, t_3\, \gamma_{21}\, \lambda_{31}\right)}{1+\hbar\, t_2\, \gamma_{21}}}\, \gamma\, \hbar^4\, t_2\, x_2^2\, y_3^2\, \gamma_{22}^2\, \gamma_{31}^2-$$

$$2\, e^{\frac{\gamma\left(\hbar\, t_2\, \lambda_{11}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{11}+\hbar\, t_2\, \lambda_{21}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{21}+\hbar\, t_3\, \lambda_{31}+\hbar^2\, t_2\, t_3\, \gamma_{21}\, \lambda_{31}\right)}{1+\hbar\, t_2\, \gamma_{21}}}\, \gamma\, \hbar^3\, x_3\, x_{\$133}\, y_3^2\, \gamma_{23}\, \gamma_{31}^2+$$

$$2\, e^{\frac{\gamma\left(\hbar\, t_2\, \lambda_{11}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{11}+\hbar\, t_2\, \lambda_{21}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{21}+\hbar\, t_3\, \lambda_{31}+\hbar^2\, t_2\, t_3\, \gamma_{21}\, \lambda_{31}\right)}{1+\hbar\, t_2\, \gamma_{21}}}\, \gamma\, \hbar^4\, t_2\, x_2\, x_3\, y_3^2\, \gamma_{22}\, \gamma_{23}\, \gamma_{31}^2+$$

$$\left.e^{\frac{\gamma\left(\hbar\, t_2\, \lambda_{11}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{11}+\hbar\, t_2\, \lambda_{21}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{21}+\hbar\, t_3\, \lambda_{31}+\hbar^2\, t_2\, t_3\, \gamma_{21}\, \lambda_{31}\right)}{1+\hbar\, t_2\, \gamma_{21}}}\, \gamma\, \hbar^4\, t_2\, x_3^2\, y_3^2\, \gamma_{23}^2\, \gamma_{31}^2\right)\in+O[\in]^2,\ e^{(\upsilon\$5058+\omega\$5058)\, y_{n\$5058}}+O[\in]^3\Bigg\}$$

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\begin{aligned}
&\text{Œ}_{\text{CU}}\Big[\{y_3, a_3, x_3\}_3, \{y_{\$135}, a_{\$134}, a_{\$133}, x_{\$133}, a_2, x_2\}_2, \frac{1}{1+\hbar\, t_2\, \gamma_{21}} \\
&\quad e^{-\gamma\hbar t_2 \lambda_{11}-\gamma\hbar t_2 \lambda_{21}-\gamma\hbar t_3 \lambda_{31}} \Big(e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar\, x_{\$133}\, y_{\$135}\, \gamma_{11} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar\, x_2\, y_{\$135}\, \gamma_{12} + \\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar\, x_3\, y_{\$135}\, \gamma_{13} + \hbar\, x_{\$133}\, y_{\$135}\, \gamma_{21} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2 t_2\, x_2\, y_{\$135}\, \gamma_{12}\, \gamma_{21} + \\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2 t_2\, x_3\, y_{\$135}\, \gamma_{13}\, \gamma_{21} + \hbar\, x_2\, y_{\$135}\, \gamma_{22} - e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2 t_2\, x_2\, y_{\$135}\, \gamma_{11}\, \gamma_{22} + \\
&\quad \hbar\, x_3\, y_{\$135}\, \gamma_{23} - e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2 t_2\, x_3\, y_{\$135}\, \gamma_{11}\, \gamma_{23} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar\, x_{\$133}\, y_3\, \gamma_{31} - \\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2 t_2\, x_2\, y_3\, \gamma_{22}\, \gamma_{31} - e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2 t_2\, x_3\, y_3\, \gamma_{23}\, \gamma_{31} + \\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar\, x_2\, y_3\, \gamma_{32} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2 t_2\, x_2\, y_3\, \gamma_{21}\, \gamma_{32} + \\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar\, x_3\, y_3\, \gamma_{33} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2 t_2\, x_3\, y_3\, \gamma_{21}\, \gamma_{33} + \\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar\, a_{\$134}\, t_2\, \lambda_{11} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2 a_{\$134}\, t_2^2\, \gamma_{21}\, \lambda_{11} + \\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar\, a_2\, t_2\, \lambda_{12} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2 a_2\, t_2^2\, \gamma_{21}\, \lambda_{12} + \\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar\, a_3\, t_2\, \lambda_{13} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2 a_3\, t_2^2\, \gamma_{21}\, \lambda_{13} + \\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar\, a_{\$134}\, t_2\, \lambda_{21} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2 a_{\$134}\, t_2^2\, \gamma_{21}\, \lambda_{21} + \\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar\, a_2\, t_2\, \lambda_{22} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2 a_2\, t_2^2\, \gamma_{21}\, \lambda_{22} + \\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar\, a_3\, t_2\, \lambda_{23} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2 a_3\, t_2^2\, \gamma_{21}\, \lambda_{23} + \\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar\, a_{\$134}\, t_3\, \lambda_{31} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2 a_{\$134}\, t_2\, t_3\, \gamma_{21}\, \lambda_{31} + \\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar\, a_2\, t_3\, \lambda_{32} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2 a_2\, t_2\, t_3\, \gamma_{21}\, \lambda_{32} + \\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar\, a_3\, t_3\, \lambda_{33} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2 a_3\, t_2\, t_3\, \gamma_{21}\, \lambda_{33}\Big), \\
&\quad \frac{1}{1+\hbar\, t_2\, \gamma_{21}} + \frac{1}{2\,(1+\hbar\, t_2\, \gamma_{21})}\, e^{-\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}} \\
&\quad \Big(4\, e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}} \hbar^2 a_{\$133}\, x_2\, y_{\$135}\, \gamma_{11}\, \gamma_{22} - \\
&\quad 2\, e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}} \gamma\hbar^3 x_2\, x_{\$133}\, y_{\$135}^2\, \gamma_{11}^2\, \gamma_{22} - \\
&\quad 2\gamma\hbar^3 x_2^2\, y_{\$135}^2\, \gamma_{11}\, \gamma_{22}^2 + e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}} \gamma\hbar^4 t_2\, x_2^2\, y_{\$135}^2\, \gamma_{11}^2\, \gamma_{22}^2 + \\
&\quad 4\, e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}} \hbar^2 a_{\$133}\, x_3\, y_{\$135}\, \gamma_{11}\, \gamma_{23} - \\
&\quad 2\, e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}} \gamma\hbar^3 x_3\, x_{\$133}\, y_{\$135}^2\, \gamma_{11}^2\, \gamma_{23} - 4\gamma\hbar^3 x_2\, x_3\, y_{\$135}^2\, \gamma_{11}\, \gamma_{22}\, \gamma_{23} + \\
&\quad 2\, e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}} \gamma\hbar^4 t_2\, x_2\, x_3\, y_{\$135}^2\, \gamma_{11}^2\, \gamma_{22}\, \gamma_{23} - \\
&\quad 2\gamma\hbar^3 x_3^2\, y_{\$135}^2\, \gamma_{11}\, \gamma_{23}^2 + e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}} \gamma\hbar^4 t_2\, x_3^2\, y_{\$135}^2\, \gamma_{11}^2\, \gamma_{23}^2 + \\
&\quad 4\, e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}} \hbar^2 a_{\$133}\, x_2\, y_3\, \gamma_{22}\, \gamma_{31} - \\
&\quad 4\, e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}} \gamma\hbar^3 x_2\, x_{\$133}\, y_3\, y_{\$135}\, \gamma_{11}\, \gamma_{22}\, \gamma_{31} - \\
&\quad 2\gamma\hbar^3 x_2^2\, y_3\, y_{\$135}\, \gamma_{22}^2\, \gamma_{31} + 2\, e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}} \gamma\hbar^4 t_2\, x_2^2\, y_3\, y_{\$135}\, \gamma_{11}\, \gamma_{22}^2\, \gamma_{31} + \\
&\quad 4\, e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}} \hbar^2 a_{\$133}\, x_3\, y_3\, \gamma_{23}\, \gamma_{31} - \\
&\quad 4\, e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}} \gamma\hbar^3 x_3\, x_{\$133}\, y_3\, y_{\$135}\, \gamma_{11}\, \gamma_{23}\, \gamma_{31} - 4\gamma\hbar^3 x_2\, x_3\, y_3\, y_{\$135}\, \gamma_{22}\, \gamma_{23}\, \gamma_{31} + \\
&\quad 4\, e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}} \gamma\hbar^4 t_2\, x_2\, x_3\, y_3\, y_{\$135}\, \gamma_{11}\, \gamma_{22}\, \gamma_{23}\, \gamma_{31} - \\
&\quad 2\gamma\hbar^3 x_3^2\, y_3\, y_{\$135}\, \gamma_{23}^2\, \gamma_{31} + 2\, e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}} \gamma\hbar^4 t_2\, x_3^2\, y_3\, y_{\$135}\, \gamma_{11}\, \gamma_{23}^2\, \gamma_{31} - \\
&\quad 2\, e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}} \gamma\hbar^3 x_2\, x_{\$133}\, y_3^2\, \gamma_{22}\, \gamma_{31}^2 + \\
&\quad e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}} \gamma\hbar^4 t_2\, x_2^2\, y_3^2\, \gamma_{22}^2\, \gamma_{31}^2 - 2\, e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}} \\
&\quad \gamma\hbar^3 x_3\, x_{\$133}\, y_3^2\, \gamma_{23}\, \gamma_{31}^2 + 2\, e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}} \gamma\hbar^4 t_2\, x_2\, x_3\, y_3^2\, \gamma_{22}\, \gamma_{23}\, \gamma_{31}^2 + \\
&\quad e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}} \gamma\hbar^4 t_2\, x_3^2\, y_3^2\, \gamma_{23}^2\, \gamma_{31}^2\Big) \in + O[\in]^2\Big]
\end{aligned}
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$$\left\{\left\{\left\{a_{\$134},\ \upsilon\$5068\right\},\ \left\{a_{\$133},\ \omega\$5068\right\}\right\},\ \frac{1}{1+\hbar\, t_2\, \gamma_{21}}+\frac{1}{2\,(1+\hbar\, t_2\, \gamma_{21})}\right.$$

$$e^{-\frac{\gamma\left(\hbar\, t_2\, \lambda_{11}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{11}+\hbar\, t_2\, \lambda_{21}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{21}+\hbar\, t_3\, \lambda_{31}+\hbar^2\, t_2\, t_3\, \gamma_{21}\, \lambda_{31}\right)}{1+\hbar\, t_2\, \gamma_{21}}}\left(4\, e^{\frac{\gamma\left(\hbar\, t_2\, \lambda_{11}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{11}+\hbar\, t_2\, \lambda_{21}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{21}+\hbar\, t_3\, \lambda_{31}+\hbar^2\, t_2\, t_3\, \gamma_{21}\, \lambda_{31}\right)}{1+\hbar\, t_2\, \gamma_{21}}}\, \hbar^2\, a_{\$133}\, x_2\, y_{\$135}\, \gamma_{11}\, \gamma_{22}-\right.$$

$$2\, e^{\frac{\gamma\left(\hbar\, t_2\, \lambda_{11}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{11}+\hbar\, t_2\, \lambda_{21}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{21}+\hbar\, t_3\, \lambda_{31}+\hbar^2\, t_2\, t_3\, \gamma_{21}\, \lambda_{31}\right)}{1+\hbar\, t_2\, \gamma_{21}}}\, \gamma\, \hbar^3\, x_2\, x_{\$133}\, y_{\$135}^2\, \gamma_{11}^2\, \gamma_{22}-$$

$$2\, \gamma\, \hbar^3\, x_2^2\, y_{\$135}^2\, \gamma_{11}\, \gamma_{22}^2+e^{\frac{\gamma\left(\hbar\, t_2\, \lambda_{11}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{11}+\hbar\, t_2\, \lambda_{21}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{21}+\hbar\, t_3\, \lambda_{31}+\hbar^2\, t_2\, t_3\, \gamma_{21}\, \lambda_{31}\right)}{1+\hbar\, t_2\, \gamma_{21}}}\, \gamma\, \hbar^4\, t_2\, x_2^2\, y_{\$135}^2\, \gamma_{11}^2\, \gamma_{22}^2+$$

$$4\, e^{\frac{\gamma\left(\hbar\, t_2\, \lambda_{11}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{11}+\hbar\, t_2\, \lambda_{21}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{21}+\hbar\, t_3\, \lambda_{31}+\hbar^2\, t_2\, t_3\, \gamma_{21}\, \lambda_{31}\right)}{1+\hbar\, t_2\, \gamma_{21}}}\, \hbar^2\, a_{\$133}\, x_3\, y_{\$135}\, \gamma_{11}\, \gamma_{23}-$$

$$2\, e^{\frac{\gamma\left(\hbar\, t_2\, \lambda_{11}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{11}+\hbar\, t_2\, \lambda_{21}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{21}+\hbar\, t_3\, \lambda_{31}+\hbar^2\, t_2\, t_3\, \gamma_{21}\, \lambda_{31}\right)}{1+\hbar\, t_2\, \gamma_{21}}}\, \gamma\, \hbar^3\, x_3\, x_{\$133}\, y_{\$135}^2\, \gamma_{11}^2\, \gamma_{23}-4\, \gamma\, \hbar^3\, x_2\, x_3\, y_{\$135}^2\, \gamma_{11}\, \gamma_{22}\, \gamma_{23}+$$

$$2\, e^{\frac{\gamma\left(\hbar\, t_2\, \lambda_{11}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{11}+\hbar\, t_2\, \lambda_{21}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{21}+\hbar\, t_3\, \lambda_{31}+\hbar^2\, t_2\, t_3\, \gamma_{21}\, \lambda_{31}\right)}{1+\hbar\, t_2\, \gamma_{21}}}\, \gamma\, \hbar^4\, t_2\, x_2\, x_3\, y_{\$135}^2\, \gamma_{11}^2\, \gamma_{22}\, \gamma_{23}-$$

$$2\, \gamma\, \hbar^3\, x_3^2\, y_{\$135}^2\, \gamma_{11}\, \gamma_{23}^2+e^{\frac{\gamma\left(\hbar\, t_2\, \lambda_{11}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{11}+\hbar\, t_2\, \lambda_{21}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{21}+\hbar\, t_3\, \lambda_{31}+\hbar^2\, t_2\, t_3\, \gamma_{21}\, \lambda_{31}\right)}{1+\hbar\, t_2\, \gamma_{21}}}\, \gamma\, \hbar^4\, t_2\, x_3^2\, y_{\$135}^2\, \gamma_{11}^2\, \gamma_{23}^2+$$

$$4\, e^{\frac{\gamma\left(\hbar\, t_2\, \lambda_{11}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{11}+\hbar\, t_2\, \lambda_{21}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{21}+\hbar\, t_3\, \lambda_{31}+\hbar^2\, t_2\, t_3\, \gamma_{21}\, \lambda_{31}\right)}{1+\hbar\, t_2\, \gamma_{21}}}\, \hbar^2\, a_{\$133}\, x_2\, y_3\, \gamma_{22}\, \gamma_{31}-$$

$$4\, e^{\frac{\gamma\left(\hbar\, t_2\, \lambda_{11}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{11}+\hbar\, t_2\, \lambda_{21}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{21}+\hbar\, t_3\, \lambda_{31}+\hbar^2\, t_2\, t_3\, \gamma_{21}\, \lambda_{31}\right)}{1+\hbar\, t_2\, \gamma_{21}}}\, \gamma\, \hbar^3\, x_2\, x_{\$133}\, y_3\, y_{\$135}\, \gamma_{11}\, \gamma_{22}\, \gamma_{31}-$$

$$2\, \gamma\, \hbar^3\, x_2^2\, y_3\, y_{\$135}\, \gamma_{22}^2\, \gamma_{31}+2\, e^{\frac{\gamma\left(\hbar\, t_2\, \lambda_{11}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{11}+\hbar\, t_2\, \lambda_{21}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{21}+\hbar\, t_3\, \lambda_{31}+\hbar^2\, t_2\, t_3\, \gamma_{21}\, \lambda_{31}\right)}{1+\hbar\, t_2\, \gamma_{21}}}\, \gamma\, \hbar^4\, t_2\, x_2^2\, y_3\, y_{\$135}\, \gamma_{11}\, \gamma_{22}^2\, \gamma_{31}+$$

$$4\, e^{\frac{\gamma\left(\hbar\, t_2\, \lambda_{11}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{11}+\hbar\, t_2\, \lambda_{21}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{21}+\hbar\, t_3\, \lambda_{31}+\hbar^2\, t_2\, t_3\, \gamma_{21}\, \lambda_{31}\right)}{1+\hbar\, t_2\, \gamma_{21}}}\, \hbar^2\, a_{\$133}\, x_3\, y_3\, \gamma_{23}\, \gamma_{31}-$$

$$4\, e^{\frac{\gamma\left(\hbar\, t_2\, \lambda_{11}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{11}+\hbar\, t_2\, \lambda_{21}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{21}+\hbar\, t_3\, \lambda_{31}+\hbar^2\, t_2\, t_3\, \gamma_{21}\, \lambda_{31}\right)}{1+\hbar\, t_2\, \gamma_{21}}}\, \gamma\, \hbar^3\, x_3\, x_{\$133}\, y_3\, y_{\$135}\, \gamma_{11}\, \gamma_{23}\, \gamma_{31}-4\, \gamma\, \hbar^3\, x_2\, x_3\, y_3\, y_{\$135}\, \gamma_{22}\, \gamma_{23}\, \gamma_{31}+$$

$$4\, e^{\frac{\gamma\left(\hbar\, t_2\, \lambda_{11}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{11}+\hbar\, t_2\, \lambda_{21}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{21}+\hbar\, t_3\, \lambda_{31}+\hbar^2\, t_2\, t_3\, \gamma_{21}\, \lambda_{31}\right)}{1+\hbar\, t_2\, \gamma_{21}}}\, \gamma\, \hbar^4\, t_2\, x_2\, x_3\, y_3\, y_{\$135}\, \gamma_{11}\, \gamma_{22}\, \gamma_{23}\, \gamma_{31}-$$

$$2\, \gamma\, \hbar^3\, x_3^2\, y_3\, y_{\$135}\, \gamma_{23}^2\, \gamma_{31}+2\, e^{\frac{\gamma\left(\hbar\, t_2\, \lambda_{11}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{11}+\hbar\, t_2\, \lambda_{21}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{21}+\hbar\, t_3\, \lambda_{31}+\hbar^2\, t_2\, t_3\, \gamma_{21}\, \lambda_{31}\right)}{1+\hbar\, t_2\, \gamma_{21}}}\, \gamma\, \hbar^4\, t_2\, x_3^2\, y_3\, y_{\$135}\, \gamma_{11}\, \gamma_{23}^2\, \gamma_{31}-$$

$$2\, e^{\frac{\gamma\left(\hbar\, t_2\, \lambda_{11}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{11}+\hbar\, t_2\, \lambda_{21}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{21}+\hbar\, t_3\, \lambda_{31}+\hbar^2\, t_2\, t_3\, \gamma_{21}\, \lambda_{31}\right)}{1+\hbar\, t_2\, \gamma_{21}}}\, \gamma\, \hbar^3\, x_2\, x_{\$133}\, y_3^2\, \gamma_{22}\, \gamma_{31}^2+$$

$$e^{\frac{\gamma\left(\hbar\, t_2\, \lambda_{11}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{11}+\hbar\, t_2\, \lambda_{21}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{21}+\hbar\, t_3\, \lambda_{31}+\hbar^2\, t_2\, t_3\, \gamma_{21}\, \lambda_{31}\right)}{1+\hbar\, t_2\, \gamma_{21}}}\, \gamma\, \hbar^4\, t_2\, x_2^2\, y_3^2\, \gamma_{22}^2\, \gamma_{31}^2-$$

$$2\, e^{\frac{\gamma\left(\hbar\, t_2\, \lambda_{11}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{11}+\hbar\, t_2\, \lambda_{21}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{21}+\hbar\, t_3\, \lambda_{31}+\hbar^2\, t_2\, t_3\, \gamma_{21}\, \lambda_{31}\right)}{1+\hbar\, t_2\, \gamma_{21}}}\, \gamma\, \hbar^3\, x_3\, x_{\$133}\, y_3^2\, \gamma_{23}\, \gamma_{31}^2+$$

$$2\, e^{\frac{\gamma\left(\hbar\, t_2\, \lambda_{11}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{11}+\hbar\, t_2\, \lambda_{21}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{21}+\hbar\, t_3\, \lambda_{31}+\hbar^2\, t_2\, t_3\, \gamma_{21}\, \lambda_{31}\right)}{1+\hbar\, t_2\, \gamma_{21}}}\, \gamma\, \hbar^4\, t_2\, x_2\, x_3\, y_3^2\, \gamma_{22}\, \gamma_{23}\, \gamma_{31}^2+$$

$$\left.e^{\frac{\gamma\left(\hbar\, t_2\, \lambda_{11}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{11}+\hbar\, t_2\, \lambda_{21}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{21}+\hbar\, t_3\, \lambda_{31}+\hbar^2\, t_2\, t_3\, \gamma_{21}\, \lambda_{31}\right)}{1+\hbar\, t_2\, \gamma_{21}}}\, \gamma\, \hbar^4\, t_2\, x_3^2\, y_3^2\, \gamma_{23}^2\, \gamma_{31}^2\right)\epsilon+O[\epsilon]^2,\ e^{(\upsilon\$5068+\omega\$5068)\, a_{n\$5068}}+O[\epsilon]^3\Bigg\}$$

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\begin{aligned}
&\text{Œ}_{CU}\Big[\{y_3, a_3, x_3\}_3, \{y_{\$135}, a_{\$136}, x_{\$133}, a_2, x_2\}_2, \frac{1}{1+\hbar\, t_2\, \gamma_{21}} \\
&\quad e^{-\gamma\hbar t_2 \lambda_{11}-\gamma\hbar t_2 \lambda_{21}-\gamma\hbar t_3 \lambda_{31}} \Big(e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar\, x_{\$133}\, y_{\$135}\, \gamma_{11} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar\, x_2\, y_{\$135}\, \gamma_{12} + \\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar\, x_3\, y_{\$135}\, \gamma_{13} + \hbar\, x_{\$133}\, y_{\$135}\, \gamma_{21} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2\, t_2\, x_2\, y_{\$135}\, \gamma_{12}\, \gamma_{21} + \\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2\, t_2\, x_3\, y_{\$135}\, \gamma_{13}\, \gamma_{21} + \hbar\, x_2\, y_{\$135}\, \gamma_{22} - e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2\, t_2\, x_2\, y_{\$135}\, \gamma_{11}\, \gamma_{22} + \\
&\quad \hbar\, x_3\, y_{\$135}\, \gamma_{23} - e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2\, t_2\, x_3\, y_{\$135}\, \gamma_{11}\, \gamma_{23} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar\, x_{\$133}\, y_3\, \gamma_{31} - \\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2\, t_2\, x_2\, y_3\, \gamma_{22}\, \gamma_{31} - e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2\, t_2\, x_3\, y_3\, \gamma_{23}\, \gamma_{31} + \\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar\, x_2\, y_3\, \gamma_{32} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2\, t_2\, x_2\, y_3\, \gamma_{21}\, \gamma_{32} + \\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar\, x_3\, y_3\, \gamma_{33} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2\, t_2\, x_3\, y_3\, \gamma_{21}\, \gamma_{33} + \\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar\, a_{\$136}\, t_2\, \lambda_{11} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2\, a_{\$136}\, t_2^2\, \gamma_{21}\, \lambda_{11} + \\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar\, a_2\, t_2\, \lambda_{12} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2\, a_2\, t_2^2\, \gamma_{21}\, \lambda_{12} + \\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar\, a_3\, t_2\, \lambda_{13} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2\, a_3\, t_2^2\, \gamma_{21}\, \lambda_{13} + \\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar\, a_{\$136}\, t_2\, \lambda_{21} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2\, a_{\$136}\, t_2^2\, \gamma_{21}\, \lambda_{21} + \\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar\, a_2\, t_2\, \lambda_{22} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2\, a_2\, t_2^2\, \gamma_{21}\, \lambda_{22} + \\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar\, a_3\, t_2\, \lambda_{23} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2\, a_3\, t_2^2\, \gamma_{21}\, \lambda_{23} + \\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar\, a_{\$136}\, t_3\, \lambda_{31} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2\, a_{\$136}\, t_2\, t_3\, \gamma_{21}\, \lambda_{31} + \\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar\, a_2\, t_3\, \lambda_{32} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2\, a_2\, t_2\, t_3\, \gamma_{21}\, \lambda_{32} + \\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar\, a_3\, t_3\, \lambda_{33} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2\, a_3\, t_2\, t_3\, \gamma_{21}\, \lambda_{33}\Big), \\
&\quad \frac{1}{1+\hbar\, t_2\, \gamma_{21}} + \frac{1}{2\,(1+\hbar\, t_2\, \gamma_{21})}\, e^{-\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}} \\
&\quad \Big(4\, e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}} \hbar^2\, a_{\$136}\, x_2\, y_{\$135}\, \gamma_{11}\, \gamma_{22} - \\
&\quad 2\, e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}} \gamma\, \hbar^3\, x_2\, x_{\$133}\, y_{\$135}^2\, \gamma_{11}^2\, \gamma_{22} - \\
&\quad 2\, \gamma\, \hbar^3\, x_2^2\, y_{\$135}^2\, \gamma_{11}\, \gamma_{22}^2 + e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}} \gamma\, \hbar^4\, t_2\, x_2^2\, y_{\$135}^2\, \gamma_{11}^2\, \gamma_{22}^2 + \\
&\quad 4\, e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}} \hbar^2\, a_{\$136}\, x_3\, y_{\$135}\, \gamma_{11}\, \gamma_{23} - \\
&\quad 2\, e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}} \gamma\, \hbar^3\, x_3\, x_{\$133}\, y_{\$135}^2\, \gamma_{11}^2\, \gamma_{23} - 4\, \gamma\, \hbar^3\, x_2\, x_3\, y_{\$135}^2\, \gamma_{11}\, \gamma_{22}\, \gamma_{23} + \\
&\quad 2\, e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}} \gamma\, \hbar^4\, t_2\, x_2\, x_3\, y_{\$135}^2\, \gamma_{11}^2\, \gamma_{22}\, \gamma_{23} - \\
&\quad 2\, \gamma\, \hbar^3\, x_3^2\, y_{\$135}^2\, \gamma_{11}\, \gamma_{23}^2 + e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}} \gamma\, \hbar^4\, t_2\, x_3^2\, y_{\$135}^2\, \gamma_{11}^2\, \gamma_{23}^2 + \\
&\quad 4\, e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}} \hbar^2\, a_{\$136}\, x_2\, y_3\, \gamma_{22}\, \gamma_{31} - \\
&\quad 4\, e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}} \gamma\, \hbar^3\, x_2\, x_{\$133}\, y_3\, y_{\$135}\, \gamma_{11}\, \gamma_{22}\, \gamma_{31} - \\
&\quad 2\, \gamma\, \hbar^3\, x_2^2\, y_3\, y_{\$135}\, \gamma_{22}^2\, \gamma_{31} + 2\, e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}} \gamma\, \hbar^4\, t_2\, x_2^2\, y_3\, y_{\$135}\, \gamma_{11}\, \gamma_{22}^2\, \gamma_{31} + \\
&\quad 4\, e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}} \hbar^2\, a_{\$136}\, x_3\, y_3\, \gamma_{23}\, \gamma_{31} - \\
&\quad 4\, e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}} \gamma\, \hbar^3\, x_3\, x_{\$133}\, y_3\, y_{\$135}\, \gamma_{11}\, \gamma_{23}\, \gamma_{31} - 4\, \gamma\, \hbar^3\, x_2\, x_3\, y_3\, y_{\$135}\, \gamma_{22}\, \gamma_{23}\, \gamma_{31} + \\
&\quad 4\, e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}} \gamma\, \hbar^4\, t_2\, x_2\, x_3\, y_3\, y_{\$135}\, \gamma_{11}\, \gamma_{22}\, \gamma_{23}\, \gamma_{31} - \\
&\quad 2\, \gamma\, \hbar^3\, x_3^2\, y_3\, y_{\$135}\, \gamma_{23}^2\, \gamma_{31} + 2\, e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}} \gamma\, \hbar^4\, t_2\, x_3^2\, y_3\, y_{\$135}\, \gamma_{11}\, \gamma_{23}^2\, \gamma_{31} - \\
&\quad 2\, e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}} \gamma\, \hbar^3\, x_2\, x_{\$133}\, y_3^2\, \gamma_{22}\, \gamma_{31}^2 + \\
&\quad e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}} \gamma\, \hbar^4\, t_2\, x_2^2\, y_3^2\, \gamma_{22}^2\, \gamma_{31}^2 - 2\, e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}} \\
&\quad \gamma\, \hbar^3\, x_3\, x_{\$133}\, y_3^2\, \gamma_{23}\, \gamma_{31}^2 + 2\, e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}} \gamma\, \hbar^4\, t_2\, x_2\, x_3\, y_3^2\, \gamma_{22}\, \gamma_{23}\, \gamma_{31}^2 + \\
&\quad e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}} \gamma\, \hbar^4\, t_2\, x_3^2\, y_3^2\, \gamma_{23}^2\, \gamma_{31}^2\Big) \in + O[\in]^2\Big]
\end{aligned}
$$

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$$\Big\{\{\{x_{\$133}, \upsilon\$5078\}, \{a_2, \omega\$5078\}\}, \frac{1}{1+\hbar\, t_2\, \gamma_{21}} + \frac{1}{2\,(1+\hbar\, t_2\, \gamma_{21})}$$

$$e^{-\frac{\gamma\left(\hbar\, t_2\, \lambda_{11}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{11}+\hbar\, t_2\, \lambda_{21}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{21}+\hbar\, t_3\, \lambda_{31}+\hbar^2\, t_2\, t_3\, \gamma_{21}\, \lambda_{31}\right)}{1+\hbar\, t_2\, \gamma_{21}}} \Big(4\, e^{\frac{\gamma\left(\hbar\, t_2\, \lambda_{11}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{11}+\hbar\, t_2\, \lambda_{21}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{21}+\hbar\, t_3\, \lambda_{31}+\hbar^2\, t_2\, t_3\, \gamma_{21}\, \lambda_{31}\right)}{1+\hbar\, t_2\, \gamma_{21}}} \hbar^2\, a_{\$136}\, x_2\, y_{\$135}\, \gamma_{11}\, \gamma_{22} -$$

$$2\, e^{\frac{\gamma\left(\hbar\, t_2\, \lambda_{11}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{11}+\hbar\, t_2\, \lambda_{21}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{21}+\hbar\, t_3\, \lambda_{31}+\hbar^2\, t_2\, t_3\, \gamma_{21}\, \lambda_{31}\right)}{1+\hbar\, t_2\, \gamma_{21}}} \gamma\, \hbar^3\, x_2\, x_{\$133}\, y_{\$135}^2\, \gamma_{11}^2\, \gamma_{22} -$$

$$2\, \gamma\, \hbar^3\, x_2^2\, y_{\$135}^2\, \gamma_{11}\, \gamma_{22}^2 + e^{\frac{\gamma\left(\hbar\, t_2\, \lambda_{11}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{11}+\hbar\, t_2\, \lambda_{21}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{21}+\hbar\, t_3\, \lambda_{31}+\hbar^2\, t_2\, t_3\, \gamma_{21}\, \lambda_{31}\right)}{1+\hbar\, t_2\, \gamma_{21}}} \gamma\, \hbar^4\, t_2\, x_2^2\, y_{\$135}^2\, \gamma_{11}^2\, \gamma_{22}^2 +$$

$$4\, e^{\frac{\gamma\left(\hbar\, t_2\, \lambda_{11}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{11}+\hbar\, t_2\, \lambda_{21}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{21}+\hbar\, t_3\, \lambda_{31}+\hbar^2\, t_2\, t_3\, \gamma_{21}\, \lambda_{31}\right)}{1+\hbar\, t_2\, \gamma_{21}}} \hbar^2\, a_{\$136}\, x_3\, y_{\$135}\, \gamma_{11}\, \gamma_{23} -$$

$$2\, e^{\frac{\gamma\left(\hbar\, t_2\, \lambda_{11}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{11}+\hbar\, t_2\, \lambda_{21}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{21}+\hbar\, t_3\, \lambda_{31}+\hbar^2\, t_2\, t_3\, \gamma_{21}\, \lambda_{31}\right)}{1+\hbar\, t_2\, \gamma_{21}}} \gamma\, \hbar^3\, x_3\, x_{\$133}\, y_{\$135}^2\, \gamma_{11}^2\, \gamma_{23} - 4\, \gamma\, \hbar^3\, x_2\, x_3\, y_{\$135}^2\, \gamma_{11}\, \gamma_{22}\, \gamma_{23} +$$

$$2\, e^{\frac{\gamma\left(\hbar\, t_2\, \lambda_{11}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{11}+\hbar\, t_2\, \lambda_{21}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{21}+\hbar\, t_3\, \lambda_{31}+\hbar^2\, t_2\, t_3\, \gamma_{21}\, \lambda_{31}\right)}{1+\hbar\, t_2\, \gamma_{21}}} \gamma\, \hbar^4\, t_2\, x_2\, x_3\, y_{\$135}^2\, \gamma_{11}^2\, \gamma_{22}\, \gamma_{23} -$$

$$2\, \gamma\, \hbar^3\, x_3^2\, y_{\$135}^2\, \gamma_{11}\, \gamma_{23}^2 + e^{\frac{\gamma\left(\hbar\, t_2\, \lambda_{11}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{11}+\hbar\, t_2\, \lambda_{21}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{21}+\hbar\, t_3\, \lambda_{31}+\hbar^2\, t_2\, t_3\, \gamma_{21}\, \lambda_{31}\right)}{1+\hbar\, t_2\, \gamma_{21}}} \gamma\, \hbar^4\, t_2\, x_3^2\, y_{\$135}^2\, \gamma_{11}^2\, \gamma_{23}^2 +$$

$$4\, e^{\frac{\gamma\left(\hbar\, t_2\, \lambda_{11}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{11}+\hbar\, t_2\, \lambda_{21}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{21}+\hbar\, t_3\, \lambda_{31}+\hbar^2\, t_2\, t_3\, \gamma_{21}\, \lambda_{31}\right)}{1+\hbar\, t_2\, \gamma_{21}}} \hbar^2\, a_{\$136}\, x_2\, y_3\, \gamma_{22}\, \gamma_{31} -$$

$$4\, e^{\frac{\gamma\left(\hbar\, t_2\, \lambda_{11}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{11}+\hbar\, t_2\, \lambda_{21}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{21}+\hbar\, t_3\, \lambda_{31}+\hbar^2\, t_2\, t_3\, \gamma_{21}\, \lambda_{31}\right)}{1+\hbar\, t_2\, \gamma_{21}}} \gamma\, \hbar^3\, x_2\, x_{\$133}\, y_3\, y_{\$135}\, \gamma_{11}\, \gamma_{22}\, \gamma_{31} -$$

$$2\, \gamma\, \hbar^3\, x_2^2\, y_3\, y_{\$135}\, \gamma_{22}^2\, \gamma_{31} + 2\, e^{\frac{\gamma\left(\hbar\, t_2\, \lambda_{11}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{11}+\hbar\, t_2\, \lambda_{21}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{21}+\hbar\, t_3\, \lambda_{31}+\hbar^2\, t_2\, t_3\, \gamma_{21}\, \lambda_{31}\right)}{1+\hbar\, t_2\, \gamma_{21}}} \gamma\, \hbar^4\, t_2\, x_2^2\, y_3\, y_{\$135}\, \gamma_{11}\, \gamma_{22}^2\, \gamma_{31} +$$

$$4\, e^{\frac{\gamma\left(\hbar\, t_2\, \lambda_{11}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{11}+\hbar\, t_2\, \lambda_{21}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{21}+\hbar\, t_3\, \lambda_{31}+\hbar^2\, t_2\, t_3\, \gamma_{21}\, \lambda_{31}\right)}{1+\hbar\, t_2\, \gamma_{21}}} \hbar^2\, a_{\$136}\, x_3\, y_3\, \gamma_{23}\, \gamma_{31} -$$

$$4\, e^{\frac{\gamma\left(\hbar\, t_2\, \lambda_{11}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{11}+\hbar\, t_2\, \lambda_{21}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{21}+\hbar\, t_3\, \lambda_{31}+\hbar^2\, t_2\, t_3\, \gamma_{21}\, \lambda_{31}\right)}{1+\hbar\, t_2\, \gamma_{21}}} \gamma\, \hbar^3\, x_3\, x_{\$133}\, y_3\, y_{\$135}\, \gamma_{11}\, \gamma_{23}\, \gamma_{31} - 4\, \gamma\, \hbar^3\, x_2\, x_3\, y_3\, y_{\$135}\, \gamma_{22}\, \gamma_{23}\, \gamma_{31} +$$

$$4\, e^{\frac{\gamma\left(\hbar\, t_2\, \lambda_{11}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{11}+\hbar\, t_2\, \lambda_{21}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{21}+\hbar\, t_3\, \lambda_{31}+\hbar^2\, t_2\, t_3\, \gamma_{21}\, \lambda_{31}\right)}{1+\hbar\, t_2\, \gamma_{21}}} \gamma\, \hbar^4\, t_2\, x_2\, x_3\, y_3\, y_{\$135}\, \gamma_{11}\, \gamma_{22}\, \gamma_{23}\, \gamma_{31} -$$

$$2\, \gamma\, \hbar^3\, x_3^2\, y_3\, y_{\$135}\, \gamma_{23}^2\, \gamma_{31} + 2\, e^{\frac{\gamma\left(\hbar\, t_2\, \lambda_{11}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{11}+\hbar\, t_2\, \lambda_{21}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{21}+\hbar\, t_3\, \lambda_{31}+\hbar^2\, t_2\, t_3\, \gamma_{21}\, \lambda_{31}\right)}{1+\hbar\, t_2\, \gamma_{21}}} \gamma\, \hbar^4\, t_2\, x_3^2\, y_3\, y_{\$135}\, \gamma_{11}\, \gamma_{23}^2\, \gamma_{31} -$$

$$2\, e^{\frac{\gamma\left(\hbar\, t_2\, \lambda_{11}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{11}+\hbar\, t_2\, \lambda_{21}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{21}+\hbar\, t_3\, \lambda_{31}+\hbar^2\, t_2\, t_3\, \gamma_{21}\, \lambda_{31}\right)}{1+\hbar\, t_2\, \gamma_{21}}} \gamma\, \hbar^3\, x_2\, x_{\$133}\, y_3^2\, \gamma_{22}\, \gamma_{31}^2 +$$

$$e^{\frac{\gamma\left(\hbar\, t_2\, \lambda_{11}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{11}+\hbar\, t_2\, \lambda_{21}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{21}+\hbar\, t_3\, \lambda_{31}+\hbar^2\, t_2\, t_3\, \gamma_{21}\, \lambda_{31}\right)}{1+\hbar\, t_2\, \gamma_{21}}} \gamma\, \hbar^4\, t_2\, x_2^2\, y_3^2\, \gamma_{22}^2\, \gamma_{31}^2 -$$

$$2\, e^{\frac{\gamma\left(\hbar\, t_2\, \lambda_{11}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{11}+\hbar\, t_2\, \lambda_{21}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{21}+\hbar\, t_3\, \lambda_{31}+\hbar^2\, t_2\, t_3\, \gamma_{21}\, \lambda_{31}\right)}{1+\hbar\, t_2\, \gamma_{21}}} \gamma\, \hbar^3\, x_3\, x_{\$133}\, y_3^2\, \gamma_{23}\, \gamma_{31}^2 +$$

$$2\, e^{\frac{\gamma\left(\hbar\, t_2\, \lambda_{11}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{11}+\hbar\, t_2\, \lambda_{21}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{21}+\hbar\, t_3\, \lambda_{31}+\hbar^2\, t_2\, t_3\, \gamma_{21}\, \lambda_{31}\right)}{1+\hbar\, t_2\, \gamma_{21}}} \gamma\, \hbar^4\, t_2\, x_2\, x_3\, y_3^2\, \gamma_{22}\, \gamma_{23}\, \gamma_{31}^2 +$$

$$e^{\frac{\gamma\left(\hbar\, t_2\, \lambda_{11}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{11}+\hbar\, t_2\, \lambda_{21}+\hbar^2\, t_2^2\, \gamma_{21}\, \lambda_{21}+\hbar\, t_3\, \lambda_{31}+\hbar^2\, t_2\, t_3\, \gamma_{21}\, \lambda_{31}\right)}{1+\hbar\, t_2\, \gamma_{21}}} \gamma\, \hbar^4\, t_2\, x_3^2\, y_3^2\, \gamma_{23}^2\, \gamma_{31}^2\Big) \epsilon +$$

$$O[\epsilon]^2,\ e^{\omega\$5078\, a_{n\$5078} + e^{-\gamma\, \omega\$5078}\, \upsilon\$5078\, x_{n\$5078}} + O[\epsilon]^3\Big\}$$

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$$\mathbb{E}_{CU}\Big[\{y_3, a_3, x_3\}_3, \{y_{\$135}, a_{\$136}, a_{\$137}, x_{\$137}, x_2\}_2,$$

$$\frac{1}{1+\hbar\, t_2\, \gamma_{21}}\, e^{-\gamma\, \hbar\, t_2\, \lambda_{11} - \gamma\, \hbar\, t_2\, \lambda_{12} - \gamma\, \hbar\, t_2\, \lambda_{21} - \gamma\, \hbar\, t_2\, \lambda_{22} - \gamma\, \hbar\, t_3\, \lambda_{31} - \gamma\, \hbar\, t_3\, \lambda_{32}} \Big(e^{\gamma\, \hbar\, t_2\, \lambda_{11} + \gamma\, \hbar\, t_2\, \lambda_{21} + \gamma\, \hbar\, t_3\, \lambda_{31}}\, \hbar\, x_{\$137}\, y_{\$135}\, \gamma_{11} +$$

$$e^{\gamma\, \hbar\, t_2\, \lambda_{11} + \gamma\, \hbar\, t_2\, \lambda_{12} + \gamma\, \hbar\, t_2\, \lambda_{21} + \gamma\, \hbar\, t_2\, \lambda_{22} + \gamma\, \hbar\, t_3\, \lambda_{31} + \gamma\, \hbar\, t_3\, \lambda_{32}}\, \hbar\, x_2\, y_{\$135}\, \gamma_{12} + e^{\gamma\, \hbar\, t_2\, \lambda_{11} + \gamma\, \hbar\, t_2\, \lambda_{12} + \gamma\, \hbar\, t_2\, \lambda_{21} + \gamma\, \hbar\, t_2\, \lambda_{22} + \gamma\, \hbar\, t_3\, \lambda_{31} + \gamma\, \hbar\, t_3\, \lambda_{32}}$$

$$\hbar\, x_3\, y_{\$135}\, \gamma_{13} + \hbar\, x_{\$137}\, y_{\$135}\, \gamma_{21} + e^{\gamma\, \hbar\, t_2\, \lambda_{11} + \gamma\, \hbar\, t_2\, \lambda_{12} + \gamma\, \hbar\, t_2\, \lambda_{21} + \gamma\, \hbar\, t_2\, \lambda_{22} + \gamma\, \hbar\, t_3\, \lambda_{31} + \gamma\, \hbar\, t_3\, \lambda_{32}}\, \hbar^2\, t_2\, x_2\, y_{\$135}\, \gamma_{12}\, \gamma_{21} +$$

$$e^{\gamma\, \hbar\, t_2\, \lambda_{11} + \gamma\, \hbar\, t_2\, \lambda_{12} + \gamma\, \hbar\, t_2\, \lambda_{21} + \gamma\, \hbar\, t_2\, \lambda_{22} + \gamma\, \hbar\, t_3\, \lambda_{31} + \gamma\, \hbar\, t_3\, \lambda_{32}}\, \hbar^2\, t_2\, x_3\, y_{\$135}\, \gamma_{13}\, \gamma_{21} + e^{\gamma\, \hbar\, t_2\, \lambda_{12} + \gamma\, \hbar\, t_2\, \lambda_{22} + \gamma\, \hbar\, t_3\, \lambda_{32}}\, \hbar\, x_2\, y_{\$135}\, \gamma_{22} -$$

$$e^{\gamma\, \hbar\, t_2\, \lambda_{11} + \gamma\, \hbar\, t_2\, \lambda_{12} + \gamma\, \hbar\, t_2\, \lambda_{21} + \gamma\, \hbar\, t_2\, \lambda_{22} + \gamma\, \hbar\, t_3\, \lambda_{31} + \gamma\, \hbar\, t_3\, \lambda_{32}}\, \hbar^2\, t_2\, x_2\, y_{\$135}\, \gamma_{11}\, \gamma_{22} +$$

$$e^{\gamma\, \hbar\, t_2\, \lambda_{12} + \gamma\, \hbar\, t_2\, \lambda_{22} + \gamma\, \hbar\, t_3\, \lambda_{32}}\, \hbar\, x_3\, y_{\$135}\, \gamma_{23} - e^{\gamma\, \hbar\, t_2\, \lambda_{11} + \gamma\, \hbar\, t_2\, \lambda_{12} + \gamma\, \hbar\, t_2\, \lambda_{21} + \gamma\, \hbar\, t_2\, \lambda_{22} + \gamma\, \hbar\, t_3\, \lambda_{31} + \gamma\, \hbar\, t_3\, \lambda_{32}}\, \hbar^2\, t_2\, x_3\, y_{\$135}\, \gamma_{11}\, \gamma_{23} +$$

$$e^{\gamma\, \hbar\, t_2\, \lambda_{11} + \gamma\, \hbar\, t_2\, \lambda_{21} + \gamma\, \hbar\, t_3\, \lambda_{31}}\, \hbar\, x_{\$137}\, y_3\, \gamma_{31} - e^{\gamma\, \hbar\, t_2\, \lambda_{11} + \gamma\, \hbar\, t_2\, \lambda_{12} + \gamma\, \hbar\, t_2\, \lambda_{21} + \gamma\, \hbar\, t_2\, \lambda_{22} + \gamma\, \hbar\, t_3\, \lambda_{31} + \gamma\, \hbar\, t_3\, \lambda_{32}}\, \hbar^2\, t_2\, x_2\, y_3\, \gamma_{22}\, \gamma_{31} -$$

$$e^{\gamma\, \hbar\, t_2\, \lambda_{11} + \gamma\, \hbar\, t_2\, \lambda_{12} + \gamma\, \hbar\, t_2\, \lambda_{21} + \gamma\, \hbar\, t_2\, \lambda_{22} + \gamma\, \hbar\, t_3\, \lambda_{31} + \gamma\, \hbar\, t_3\, \lambda_{32}}\, \hbar^2\, t_2\, x_3\, y_3\, \gamma_{23}\, \gamma_{31} +$$

$$e^{\gamma\, \hbar\, t_2\, \lambda_{11} + \gamma\, \hbar\, t_2\, \lambda_{12} + \gamma\, \hbar\, t_2\, \lambda_{21} + \gamma\, \hbar\, t_2\, \lambda_{22} + \gamma\, \hbar\, t_3\, \lambda_{31} + \gamma\, \hbar\, t_3\, \lambda_{32}}\, \hbar\, x_2\, y_3\, \gamma_{32} +$$

$$e^{\gamma\, \hbar\, t_2\, \lambda_{11} + \gamma\, \hbar\, t_2\, \lambda_{12} + \gamma\, \hbar\, t_2\, \lambda_{21} + \gamma\, \hbar\, t_2\, \lambda_{22} + \gamma\, \hbar\, t_3\, \lambda_{31} + \gamma\, \hbar\, t_3\, \lambda_{32}}\, \hbar^2\, t_2\, x_2\, y_3\, \gamma_{21}\, \gamma_{32} +$$

$$e^{\gamma\, \hbar\, t_2\, \lambda_{11} + \gamma\, \hbar\, t_2\, \lambda_{12} + \gamma\, \hbar\, t_2\, \lambda_{21} + \gamma\, \hbar\, t_2\, \lambda_{22} + \gamma\, \hbar\, t_3\, \lambda_{31} + \gamma\, \hbar\, t_3\, \lambda_{32}}\, \hbar\, x_3\, y_3\, \gamma_{33} + e^{\gamma\, \hbar\, t_2\, \lambda_{11} + \gamma\, \hbar\, t_2\, \lambda_{12} + \gamma\, \hbar\, t_2\, \lambda_{21} + \gamma\, \hbar\, t_2\, \lambda_{22} + \gamma\, \hbar\, t_3\, \lambda_{31} + \gamma\, \hbar\, t_3\, \lambda_{32}}$$

$$\hbar^2\, t_2\, x_3\, y_3\, \gamma_{21}\, \gamma_{33} + e^{\gamma\, \hbar\, t_2\, \lambda_{11} + \gamma\, \hbar\, t_2\, \lambda_{12} + \gamma\, \hbar\, t_2\, \lambda_{21} + \gamma\, \hbar\, t_2\, \lambda_{22} + \gamma\, \hbar\, t_3\, \lambda_{31} + \gamma\, \hbar\, t_3\, \lambda_{32}}\, \hbar\, a_{\$136}\, t_2\, \lambda_{11} +$$

$$e^{\gamma\, \hbar\, t_2\, \lambda_{11} + \gamma\, \hbar\, t_2\, \lambda_{12} + \gamma\, \hbar\, t_2\, \lambda_{21} + \gamma\, \hbar\, t_2\, \lambda_{22} + \gamma\, \hbar\, t_3\, \lambda_{31} + \gamma\, \hbar\, t_3\, \lambda_{32}}\, \hbar^2\, a_{\$136}\, t_2^2\, \gamma_{21}\, \lambda_{11} +$$

$$e^{\gamma\, \hbar\, t_2\, \lambda_{11} + \gamma\, \hbar\, t_2\, \lambda_{12} + \gamma\, \hbar\, t_2\, \lambda_{21} + \gamma\, \hbar\, t_2\, \lambda_{22} + \gamma\, \hbar\, t_3\, \lambda_{31} + \gamma\, \hbar\, t_3\, \lambda_{32}}\, \hbar\, a_{\$137}\, t_2\, \lambda_{12} + e^{\gamma\, \hbar\, t_2\, \lambda_{11} + \gamma\, \hbar\, t_2\, \lambda_{12} + \gamma\, \hbar\, t_2\, \lambda_{21} + \gamma\, \hbar\, t_2\, \lambda_{22} + \gamma\, \hbar\, t_3\, \lambda_{31} + \gamma\, \hbar\, t_3\, \lambda_{32}}$$

$$\hbar^2\, a_{\$137}\, t_2^2\, \gamma_{21}\, \lambda_{12} + e^{\gamma\, \hbar\, t_2\, \lambda_{11} + \gamma\, \hbar\, t_2\, \lambda_{12} + \gamma\, \hbar\, t_2\, \lambda_{21} + \gamma\, \hbar\, t_2\, \lambda_{22} + \gamma\, \hbar\, t_3\, \lambda_{31} + \gamma\, \hbar\, t_3\, \lambda_{32}}\, \hbar\, a_3\, t_2\, \lambda_{13} +$$

$$e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{12}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_2\lambda_{22}+\gamma\hbar t_3\lambda_{31}+\gamma\hbar t_3\lambda_{32}}\hbar^2 a_3 t_2^2\gamma_{21}\lambda_{13} +$$
$$e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{12}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_2\lambda_{22}+\gamma\hbar t_3\lambda_{31}+\gamma\hbar t_3\lambda_{32}}\hbar a_{\$136} t_2\lambda_{21} + e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{12}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_2\lambda_{22}+\gamma\hbar t_3\lambda_{31}+\gamma\hbar t_3\lambda_{32}}$$
$$\hbar^2 a_{\$136} t_2^2\gamma_{21}\lambda_{21} + e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{12}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_2\lambda_{22}+\gamma\hbar t_3\lambda_{31}+\gamma\hbar t_3\lambda_{32}}\hbar a_{\$137} t_2\lambda_{22} +$$
$$e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{12}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_2\lambda_{22}+\gamma\hbar t_3\lambda_{31}+\gamma\hbar t_3\lambda_{32}}\hbar^2 a_{\$137} t_2^2\gamma_{21}\lambda_{22} +$$
$$e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{12}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_2\lambda_{22}+\gamma\hbar t_3\lambda_{31}+\gamma\hbar t_3\lambda_{32}}\hbar a_3 t_2\lambda_{23} + e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{12}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_2\lambda_{22}+\gamma\hbar t_3\lambda_{31}+\gamma\hbar t_3\lambda_{32}}$$
$$\hbar^2 a_3 t_2^2\gamma_{21}\lambda_{23} + e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{12}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_2\lambda_{22}+\gamma\hbar t_3\lambda_{31}+\gamma\hbar t_3\lambda_{32}}\hbar a_{\$136} t_3\lambda_{31} +$$
$$e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{12}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_2\lambda_{22}+\gamma\hbar t_3\lambda_{31}+\gamma\hbar t_3\lambda_{32}}\hbar^2 a_{\$136} t_2 t_3\gamma_{21}\lambda_{31} +$$
$$e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{12}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_2\lambda_{22}+\gamma\hbar t_3\lambda_{31}+\gamma\hbar t_3\lambda_{32}}\hbar a_{\$137} t_3\lambda_{32} +$$
$$e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{12}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_2\lambda_{22}+\gamma\hbar t_3\lambda_{31}+\gamma\hbar t_3\lambda_{32}}\hbar^2 a_{\$137} t_2 t_3\gamma_{21}\lambda_{32} +$$
$$e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{12}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_2\lambda_{22}+\gamma\hbar t_3\lambda_{31}+\gamma\hbar t_3\lambda_{32}}\hbar a_3 t_3\lambda_{33} +$$
$$e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{12}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_2\lambda_{22}+\gamma\hbar t_3\lambda_{31}+\gamma\hbar t_3\lambda_{32}}\hbar^2 a_3 t_2 t_3\gamma_{21}\lambda_{33}\Big),\ \frac{1}{1+\hbar t_2\gamma_{21}} + \frac{1}{2\,(1+\hbar t_2\gamma_{21})}$$

$$e^{-\frac{\gamma\left(\hbar t_2\lambda_{11}+\hbar^2 t_2^2\gamma_{21}\lambda_{11}+\hbar t_2\lambda_{21}+\hbar^2 t_2^2\gamma_{21}\lambda_{21}+\hbar t_3\lambda_{31}+\hbar^2 t_2 t_3\gamma_{21}\lambda_{31}\right)}{1+\hbar t_2\gamma_{21}}} - \frac{e^{-\gamma\hbar t_2\lambda_{11}-\gamma\hbar t_2\lambda_{21}-\gamma\hbar t_3\lambda_{31}}\gamma\left(e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar t_2\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar^2 t_2^2\gamma_{21}\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{2}}\right.}{}$$

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$$e^{\frac{\gamma\left(\hbar t_2\lambda_{11}+\hbar^2 t_2^2\gamma_{21}\lambda_{11}+\hbar t_2\lambda_{21}+\hbar^2 t_2^2\gamma_{21}\lambda_{21}+\hbar t_3\lambda_{31}+\hbar^2 t_2 t_3\gamma_{21}\lambda_{31}\right)}{1+\hbar t_2\gamma_{21}}} + \frac{e^{-\gamma\hbar t_2\lambda_{11}-\gamma\hbar t_2\lambda_{21}-\gamma\hbar t_3\lambda_{31}}\gamma\left(e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar t_2\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar^2 t_2^2\gamma_{21}\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}}\right.}{}$$
$$\hbar^2 a_{\$136} x_2 y_{\$135}\gamma_{11}\gamma_{22} - 2\,e^{\frac{\gamma\left(\hbar t_2\lambda_{11}+\hbar^2 t_2^2\gamma_{21}\lambda_{11}+\hbar t_2\lambda_{21}+\hbar^2 t_2^2\gamma_{21}\lambda_{21}+\hbar t_3\lambda_{31}+\hbar^2 t_2 t_3\gamma_{21}\lambda_{31}\right)}{1+\hbar t_2\gamma_{21}}}$$
$$\gamma\hbar^3 x_2 x_{\$137} y_{\$135}^2\gamma_{11}^2\gamma_{22} - 2$$
$$e^{\frac{e^{-\gamma\hbar t_2\lambda_{11}-\gamma\hbar t_2\lambda_{21}-\gamma\hbar t_3\lambda_{31}}\gamma\left(e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar t_2\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar^2 t_2^2\gamma_{21}\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar t_2\lambda_{22}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar^2 t_2^2\gamma_{21}\lambda_{22}+e^{\gamma\hbar t}\right.}{1+\hbar t_2\gamma_{21}}}$$
$$\gamma\hbar^3 x_2^2 y_{\$135}^2\gamma_{11}\gamma_{22}^2 +$$
$$e^{\frac{\gamma\left(\hbar t_2\lambda_{11}+\hbar^2 t_2^2\gamma_{21}\lambda_{11}+\hbar t_2\lambda_{21}+\hbar^2 t_2^2\gamma_{21}\lambda_{21}+\hbar t_3\lambda_{31}+\hbar^2 t_2 t_3\gamma_{21}\lambda_{31}\right)}{1+\hbar t_2\gamma_{21}}} + \frac{e^{-\gamma\hbar t_2\lambda_{11}-\gamma\hbar t_2\lambda_{21}-\gamma\hbar t_3\lambda_{31}}\gamma\left(e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar t_2\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar^2 t_2^2\gamma_{21}\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma}\right.}{}$$
$$\gamma\hbar^4 t_2 x_2^2 y_{\$135}^2\gamma_{11}^2\gamma_{22}^2 + 4$$
$$e^{\frac{\gamma\left(\hbar t_2\lambda_{11}+\hbar^2 t_2^2\gamma_{21}\lambda_{11}+\hbar t_2\lambda_{21}+\hbar^2 t_2^2\gamma_{21}\lambda_{21}+\hbar t_3\lambda_{31}+\hbar^2 t_2 t_3\gamma_{21}\lambda_{31}\right)}{1+\hbar t_2\gamma_{21}}} + \frac{e^{-\gamma\hbar t_2\lambda_{11}-\gamma\hbar t_2\lambda_{21}-\gamma\hbar t_3\lambda_{31}}\gamma\left(e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar t_2\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar^2 t_2^2\gamma_{21}\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}}\right.}{}$$
$$\hbar^2 a_{\$136} x_3 y_{\$135}\gamma_{11}\gamma_{23} - 2\,e^{\frac{\gamma\left(\hbar t_2\lambda_{11}+\hbar^2 t_2^2\gamma_{21}\lambda_{11}+\hbar t_2\lambda_{21}+\hbar^2 t_2^2\gamma_{21}\lambda_{21}+\hbar t_3\lambda_{31}+\hbar^2 t_2 t_3\gamma_{21}\lambda_{31}\right)}{1+\hbar t_2\gamma_{21}}}$$
$$\gamma\hbar^3 x_3 x_{\$137} y_{\$135}^2\gamma_{11}^2\gamma_{23} - 4$$
$$e^{\frac{e^{-\gamma\hbar t_2\lambda_{11}-\gamma\hbar t_2\lambda_{21}-\gamma\hbar t_3\lambda_{31}}\gamma\left(e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar t_2\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar^2 t_2^2\gamma_{21}\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar t_2\lambda_{22}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar^2 t_2^2\gamma_{21}\lambda_{22}+e^{\gamma\hbar t}\right.}{1+\hbar t_2\gamma_{21}}}$$
$$\gamma\hbar^3 x_2 x_3 y_{\$135}^2\gamma_{11}\gamma_{22}\gamma_{23} + 2$$
$$e^{\frac{\gamma\left(\hbar t_2\lambda_{11}+\hbar^2 t_2^2\gamma_{21}\lambda_{11}+\hbar t_2\lambda_{21}+\hbar^2 t_2^2\gamma_{21}\lambda_{21}+\hbar t_3\lambda_{31}+\hbar^2 t_2 t_3\gamma_{21}\lambda_{31}\right)}{1+\hbar t_2\gamma_{21}}} + \frac{e^{-\gamma\hbar t_2\lambda_{11}-\gamma\hbar t_2\lambda_{21}-\gamma\hbar t_3\lambda_{31}}\gamma\left(e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar t_2\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar^2 t_2^2\gamma_{21}\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}}\right.}{}$$
$$\gamma\hbar^4 t_2 x_2 x_3 y_{\$135}^2\gamma_{11}^2\gamma_{22}\gamma_{23} - 2$$
$$e^{\frac{e^{-\gamma\hbar t_2\lambda_{11}-\gamma\hbar t_2\lambda_{21}-\gamma\hbar t_3\lambda_{31}}\gamma\left(e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar t_2\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar^2 t_2^2\gamma_{21}\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar t_2\lambda_{22}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar^2 t_2^2\gamma_{21}\lambda_{22}+e^{\gamma\hbar t}\right.}{1+\hbar t_2\gamma_{21}}}$$
$$\gamma\hbar^3 x_3^2 y_{\$135}^2\gamma_{11}\gamma_{23}^2 +$$
$$e^{\frac{\gamma\left(\hbar t_2\lambda_{11}+\hbar^2 t_2^2\gamma_{21}\lambda_{11}+\hbar t_2\lambda_{21}+\hbar^2 t_2^2\gamma_{21}\lambda_{21}+\hbar t_3\lambda_{31}+\hbar^2 t_2 t_3\gamma_{21}\lambda_{31}\right)}{1+\hbar t_2\gamma_{21}}} + \frac{e^{-\gamma\hbar t_2\lambda_{11}-\gamma\hbar t_2\lambda_{21}-\gamma\hbar t_3\lambda_{31}}\gamma\left(e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar t_2\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar^2 t_2^2\gamma_{21}\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma}\right.}{}$$
$$\gamma\hbar^4 t_2 x_3^2 y_{\$135}^2\gamma_{11}^2\gamma_{23}^2 + 4$$
$$e^{\frac{\gamma\left(\hbar t_2\lambda_{11}+\hbar^2 t_2^2\gamma_{21}\lambda_{11}+\hbar t_2\lambda_{21}+\hbar^2 t_2^2\gamma_{21}\lambda_{21}+\hbar t_3\lambda_{31}+\hbar^2 t_2 t_3\gamma_{21}\lambda_{31}\right)}{1+\hbar t_2\gamma_{21}}} + \frac{e^{-\gamma\hbar t_2\lambda_{11}-\gamma\hbar t_2\lambda_{21}-\gamma\hbar t_3\lambda_{31}}\gamma\left(e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar t_2\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar^2 t_2^2\gamma_{21}\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}}\right.}{}$$
$$\hbar^2 a_{\$136} x_2 y_3\gamma_{22}\gamma_{31} - 4\,e^{\frac{\gamma\left(\hbar t_2\lambda_{11}+\hbar^2 t_2^2\gamma_{21}\lambda_{11}+\hbar t_2\lambda_{21}+\hbar^2 t_2^2\gamma_{21}\lambda_{21}+\hbar t_3\lambda_{31}+\hbar^2 t_2 t_3\gamma_{21}\lambda_{31}\right)}{1+\hbar t_2\gamma_{21}}}$$
$$\gamma\hbar^3 x_2 x_{\$137} y_3 y_{\$135}\gamma_{11}\gamma_{22}\gamma_{31} - 2$$
$$e^{\frac{e^{-\gamma\hbar t_2\lambda_{11}-\gamma\hbar t_2\lambda_{21}-\gamma\hbar t_3\lambda_{31}}\gamma\left(e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar t_2\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar^2 t_2^2\gamma_{21}\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar t_2\lambda_{22}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar^2 t_2^2\gamma_{21}\lambda_{22}+e^{\gamma\hbar t}\right.}{1+\hbar t_2\gamma_{21}}}$$
$$\gamma\hbar^3 x_2^2 y_3 y_{\$135}\gamma_{22}^2\gamma_{31} + 2$$
$$e^{\frac{\gamma\left(\hbar t_2\lambda_{11}+\hbar^2 t_2^2\gamma_{21}\lambda_{11}+\hbar t_2\lambda_{21}+\hbar^2 t_2^2\gamma_{21}\lambda_{21}+\hbar t_3\lambda_{31}+\hbar^2 t_2 t_3\gamma_{21}\lambda_{31}\right)}{1+\hbar t_2\gamma_{21}}} + \frac{e^{-\gamma\hbar t_2\lambda_{11}-\gamma\hbar t_2\lambda_{21}-\gamma\hbar t_3\lambda_{31}}\gamma\left(e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar t_2\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar^2 t_2^2\gamma_{21}\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}}\right.}{}$$
$$\gamma\hbar^4 t_2 x_2^2 y_3 y_{\$135}\gamma_{11}\gamma_{22}^2\gamma_{31} + 4$$
$$e^{\frac{\gamma\left(\hbar t_2\lambda_{11}+\hbar^2 t_2^2\gamma_{21}\lambda_{11}+\hbar t_2\lambda_{21}+\hbar^2 t_2^2\gamma_{21}\lambda_{21}+\hbar t_3\lambda_{31}+\hbar^2 t_2 t_3\gamma_{21}\lambda_{31}\right)}{1+\hbar t_2\gamma_{21}}} + \frac{e^{-\gamma\hbar t_2\lambda_{11}-\gamma\hbar t_2\lambda_{21}-\gamma\hbar t_3\lambda_{31}}\gamma\left(e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar t_2\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar^2 t_2^2\gamma_{21}\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}}\right.}{}$$
$$\hbar^2 a_{\$136} x_3 y_3\gamma_{23}\gamma_{31} - 4\,e^{\frac{\gamma\left(\hbar t_2\lambda_{11}+\hbar^2 t_2^2\gamma_{21}\lambda_{11}+\hbar t_2\lambda_{21}+\hbar^2 t_2^2\gamma_{21}\lambda_{21}+\hbar t_3\lambda_{31}+\hbar^2 t_2 t_3\gamma_{21}\lambda_{31}\right)}{1+\hbar t_2\gamma_{21}}}$$

$$\gamma\,\hbar^3\,x_3\,x_{\$137}\,y_3\,y_{\$135}\,\gamma_{11}\,\gamma_{23}\,\gamma_{31} - 4\,e^{\frac{e^{-\gamma\hbar t_2\lambda_{11}-\gamma\hbar t_2\lambda_{21}-\gamma\hbar t_3\lambda_{31}}\gamma\left(e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar t_2\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar^2 t_2^2\gamma_{21}\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar t_2\lambda_{22}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar^2 t_2^2\gamma_{21}\lambda_{22}+e^{\gamma\hbar t}\right.}{1+\hbar t_2\gamma_{21}}}$$

$$\gamma\,\hbar^3\,x_2\,x_3\,y_3\,y_{\$135}\,\gamma_{22}\,\gamma_{23}\,\gamma_{31} + 4\,e^{\frac{\gamma\left(\hbar t_2\lambda_{11}+\hbar^2 t_2^2\gamma_{21}\lambda_{11}+\hbar t_2\lambda_{21}+\hbar^2 t_2^2\gamma_{21}\lambda_{21}+\hbar t_3\lambda_{31}+\hbar^2 t_2 t_3\gamma_{21}\lambda_{31}\right)}{1+\hbar t_2\gamma_{21}}}+\frac{e^{-\gamma\hbar t_2\lambda_{11}-\gamma\hbar t_2\lambda_{21}-\gamma\hbar t_3\lambda_{31}}\gamma\left(e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar t_2\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar^2 t_2^2\gamma_{21}\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}}\right.}{}$$

$$\gamma\,\hbar^4\,t_2\,x_2\,x_3\,y_3\,y_{\$135}\,\gamma_{11}\,\gamma_{22}\,\gamma_{23}\,\gamma_{31} - 2\,e^{\frac{e^{-\gamma\hbar t_2\lambda_{11}-\gamma\hbar t_2\lambda_{21}-\gamma\hbar t_3\lambda_{31}}\gamma\left(e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar t_2\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar^2 t_2^2\gamma_{21}\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar t_2\lambda_{22}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar^2 t_2^2\gamma_{21}\lambda_{22}+e^{\gamma\hbar t}\right.}{1+\hbar t_2\gamma_{21}}}$$

$$\gamma\,\hbar^3\,x_3^2\,y_3\,y_{\$135}\,\gamma_{23}^2\,\gamma_{31} + 2\,e^{\frac{\gamma\left(\hbar t_2\lambda_{11}+\hbar^2 t_2^2\gamma_{21}\lambda_{11}+\hbar t_2\lambda_{21}+\hbar^2 t_2^2\gamma_{21}\lambda_{21}+\hbar t_3\lambda_{31}+\hbar^2 t_2 t_3\gamma_{21}\lambda_{31}\right)}{1+\hbar t_2\gamma_{21}}}+\frac{e^{-\gamma\hbar t_2\lambda_{11}-\gamma\hbar t_2\lambda_{21}-\gamma\hbar t_3\lambda_{31}}\gamma\left(e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar t_2\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar^2 t_2^2\gamma_{21}\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}}\right.}{}$$

$$\gamma\,\hbar^4\,t_2\,x_3^2\,y_3\,y_{\$135}\,\gamma_{11}\,\gamma_{23}^2\,\gamma_{31} - 2\,e^{\frac{\gamma\left(\hbar t_2\lambda_{11}+\hbar^2 t_2^2\gamma_{21}\lambda_{11}+\hbar t_2\lambda_{21}+\hbar^2 t_2^2\gamma_{21}\lambda_{21}+\hbar t_3\lambda_{31}+\hbar^2 t_2 t_3\gamma_{21}\lambda_{31}\right)}{1+\hbar t_2\gamma_{21}}}$$

$$\gamma\,\hbar^3\,x_2\,x_{\$137}\,y_3^2\,\gamma_{22}\,\gamma_{31}^2 +$$

$$e^{\frac{\gamma\left(\hbar t_2\lambda_{11}+\hbar^2 t_2^2\gamma_{21}\lambda_{11}+\hbar t_2\lambda_{21}+\hbar^2 t_2^2\gamma_{21}\lambda_{21}+\hbar t_3\lambda_{31}+\hbar^2 t_2 t_3\gamma_{21}\lambda_{31}\right)}{1+\hbar t_2\gamma_{21}}}+\frac{e^{-\gamma\hbar t_2\lambda_{11}-\gamma\hbar t_2\lambda_{21}-\gamma\hbar t_3\lambda_{31}}\gamma\left(e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar t_2\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar^2 t_2^2\gamma_{21}\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma}\right.}{}$$

$$\gamma\,\hbar^4\,t_2\,x_2^2\,y_3^2\,\gamma_{22}^2\,\gamma_{31}^2 - 2\,e^{\frac{\gamma\left(\hbar t_2\lambda_{11}+\hbar^2 t_2^2\gamma_{21}\lambda_{11}+\hbar t_2\lambda_{21}+\hbar^2 t_2^2\gamma_{21}\lambda_{21}+\hbar t_3\lambda_{31}+\hbar^2 t_2 t_3\gamma_{21}\lambda_{31}\right)}{1+\hbar t_2\gamma_{21}}}\,\gamma\,\hbar^3\,x_3\,x_{\$137}\,y_3^2\,\gamma_{23}\,\gamma_{31}^2 + 2$$

$$e^{\frac{\gamma\left(\hbar t_2\lambda_{11}+\hbar^2 t_2^2\gamma_{21}\lambda_{11}+\hbar t_2\lambda_{21}+\hbar^2 t_2^2\gamma_{21}\lambda_{21}+\hbar t_3\lambda_{31}+\hbar^2 t_2 t_3\gamma_{21}\lambda_{31}\right)}{1+\hbar t_2\gamma_{21}}}+\frac{e^{-\gamma\hbar t_2\lambda_{11}-\gamma\hbar t_2\lambda_{21}-\gamma\hbar t_3\lambda_{31}}\gamma\left(e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar t_2\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar^2 t_2^2\gamma_{21}\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}}\right.}{}$$

$$\gamma\,\hbar^4\,t_2\,x_2\,x_3\,y_3^2\,\gamma_{22}\,\gamma_{23}\,\gamma_{31}^2 +$$

$$e^{\frac{\gamma\left(\hbar t_2\lambda_{11}+\hbar^2 t_2^2\gamma_{21}\lambda_{11}+\hbar t_2\lambda_{21}+\hbar^2 t_2^2\gamma_{21}\lambda_{21}+\hbar t_3\lambda_{31}+\hbar^2 t_2 t_3\gamma_{21}\lambda_{31}\right)}{1+\hbar t_2\gamma_{21}}}+\frac{e^{-\gamma\hbar t_2\lambda_{11}-\gamma\hbar t_2\lambda_{21}-\gamma\hbar t_3\lambda_{31}}\gamma\left(e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar t_2\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar^2 t_2^2\gamma_{21}\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma}\right.}{}$$

$$\left.\gamma\,\hbar^4\,t_2\,x_3^2\,y_3^2\,\gamma_{23}^2\,\gamma_{31}^2\right)\epsilon + O[\epsilon]^2\Big]$$

» $$\left\{\left\{\left\{a_{\$136},\ \upsilon\$5088\right\},\ \left\{a_{\$137},\ \omega\$5088\right\}\right\},\ \frac{1}{1+\hbar t_2\gamma_{21}}+\frac{1}{2\,(1+\hbar t_2\gamma_{21})}\right.$$

$$e^{-\frac{\gamma\left(\hbar t_2\lambda_{11}+\hbar^2 t_2^2\gamma_{21}\lambda_{11}+\hbar t_2\lambda_{21}+\hbar^2 t_2^2\gamma_{21}\lambda_{21}+\hbar t_3\lambda_{31}+\hbar^2 t_2 t_3\gamma_{21}\lambda_{31}\right)}{1+\hbar t_2\gamma_{21}}}-\frac{e^{-\gamma\hbar t_2\lambda_{11}-\gamma\hbar t_2\lambda_{21}-\gamma\hbar t_3\lambda_{31}}\gamma\left(e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar t_2\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar^2 t_2^2\gamma_{21}\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{2}}\right.}{}$$

$$\Bigg(4$$

$$e^{\frac{\gamma\left(\hbar t_2\lambda_{11}+\hbar^2 t_2^2\gamma_{21}\lambda_{11}+\hbar t_2\lambda_{21}+\hbar^2 t_2^2\gamma_{21}\lambda_{21}+\hbar t_3\lambda_{31}+\hbar^2 t_2 t_3\gamma_{21}\lambda_{31}\right)}{1+\hbar t_2\gamma_{21}}}+\frac{e^{-\gamma\hbar t_2\lambda_{11}-\gamma\hbar t_2\lambda_{21}-\gamma\hbar t_3\lambda_{31}}\gamma\left(e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar t_2\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar^2 t_2^2\gamma_{21}\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}}\right.}{}$$

$$\hbar^2\,a_{\$136}\,x_2\,y_{\$135}\,\gamma_{11}\,\gamma_{22} - 2\,e^{\frac{\gamma\left(\hbar t_2\lambda_{11}+\hbar^2 t_2^2\gamma_{21}\lambda_{11}+\hbar t_2\lambda_{21}+\hbar^2 t_2^2\gamma_{21}\lambda_{21}+\hbar t_3\lambda_{31}+\hbar^2 t_2 t_3\gamma_{21}\lambda_{31}\right)}{1+\hbar t_2\gamma_{21}}}$$

$$\gamma\,\hbar^3\,x_2\,x_{\$137}\,y_{\$135}^2\,\gamma_{11}^2\,\gamma_{22} - 2$$

$$e^{\frac{e^{-\gamma\hbar t_2\lambda_{11}-\gamma\hbar t_2\lambda_{21}-\gamma\hbar t_3\lambda_{31}}\gamma\left(e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar t_2\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar^2 t_2^2\gamma_{21}\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar t_2\lambda_{22}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar^2 t_2^2\gamma_{21}\lambda_{22}+e^{\gamma\hbar t}\right.}{1+\hbar t_2\gamma_{21}}}$$

$$\gamma\,\hbar^3\,x_2^2\,y_{\$135}^2\,\gamma_{11}\,\gamma_{22}^2 +$$

$$e^{\frac{\gamma\left(\hbar t_2\lambda_{11}+\hbar^2 t_2^2\gamma_{21}\lambda_{11}+\hbar t_2\lambda_{21}+\hbar^2 t_2^2\gamma_{21}\lambda_{21}+\hbar t_3\lambda_{31}+\hbar^2 t_2 t_3\gamma_{21}\lambda_{31}\right)}{1+\hbar t_2\gamma_{21}}}+\frac{e^{-\gamma\hbar t_2\lambda_{11}-\gamma\hbar t_2\lambda_{21}-\gamma\hbar t_3\lambda_{31}}\gamma\left(e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar t_2\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar^2 t_2^2\gamma_{21}\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma}\right.}{}$$

$$\gamma\,\hbar^4\,t_2\,x_2^2\,y_{\$135}^2\,\gamma_{11}^2\,\gamma_{22}^2 + 4$$

$$e^{\frac{\gamma\left(\hbar t_2\lambda_{11}+\hbar^2 t_2^2\gamma_{21}\lambda_{11}+\hbar t_2\lambda_{21}+\hbar^2 t_2^2\gamma_{21}\lambda_{21}+\hbar t_3\lambda_{31}+\hbar^2 t_2 t_3\gamma_{21}\lambda_{31}\right)}{1+\hbar t_2\gamma_{21}}}+\frac{e^{-\gamma\hbar t_2\lambda_{11}-\gamma\hbar t_2\lambda_{21}-\gamma\hbar t_3\lambda_{31}}\gamma\left(e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar t_2\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar^2 t_2^2\gamma_{21}\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}}\right.}{}$$

$$\hbar^2\,a_{\$136}\,x_3\,y_{\$135}\,\gamma_{11}\,\gamma_{23} - 2\,e^{\frac{\gamma\left(\hbar t_2\lambda_{11}+\hbar^2 t_2^2\gamma_{21}\lambda_{11}+\hbar t_2\lambda_{21}+\hbar^2 t_2^2\gamma_{21}\lambda_{21}+\hbar t_3\lambda_{31}+\hbar^2 t_2 t_3\gamma_{21}\lambda_{31}\right)}{1+\hbar t_2\gamma_{21}}}$$

$$\gamma\,\hbar^3\,x_3\,x_{\$137}\,y_{\$135}^2\,\gamma_{11}^2\,\gamma_{23} - 4$$

$$e^{\frac{e^{-\gamma\hbar t_2\lambda_{11}-\gamma\hbar t_2\lambda_{21}-\gamma\hbar t_3\lambda_{31}}\gamma\left(e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar t_2\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar^2 t_2^2\gamma_{21}\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar t_2\lambda_{22}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar^2 t_2^2\gamma_{21}\lambda_{22}+e^{\gamma\hbar t}\right.}{1+\hbar t_2\gamma_{21}}}$$

$$\gamma\,\hbar^3\,x_2\,x_3\,y_{\$135}^2\,\gamma_{11}\,\gamma_{22}\,\gamma_{23} + 2$$

$$e^{\frac{\gamma\left(\hbar t_2\lambda_{11}+\hbar^2 t_2^2\gamma_{21}\lambda_{11}+\hbar t_2\lambda_{21}+\hbar^2 t_2^2\gamma_{21}\lambda_{21}+\hbar t_3\lambda_{31}+\hbar^2 t_2 t_3\gamma_{21}\lambda_{31}\right)}{1+\hbar t_2\gamma_{21}}}+\frac{e^{-\gamma\hbar t_2\lambda_{11}-\gamma\hbar t_2\lambda_{21}-\gamma\hbar t_3\lambda_{31}}\gamma\left(e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar t_2\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar^2 t_2^2\gamma_{21}\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}}\right.}{}$$

$$\gamma\,\hbar^4\,t_2\,x_2\,x_3\,y_{\$135}^2\,\gamma_{11}^2\,\gamma_{22}\,\gamma_{23} - 2$$

$$e^{\frac{e^{-\gamma\hbar t_2\lambda_{11}-\gamma\hbar t_2\lambda_{21}-\gamma\hbar t_3\lambda_{31}}\gamma\left(e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar t_2\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar^2 t_2^2\gamma_{21}\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar t_2\lambda_{22}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar^2 t_2^2\gamma_{21}\lambda_{22}+e^{\gamma\hbar t}\right.}{1+\hbar t_2\gamma_{21}}}$$

$$\gamma\,\hbar^3\,x_3^2\,y_{\$135}^2\,\gamma_{11}\,\gamma_{23}^2 +$$

$$e^{\frac{\gamma\left(\hbar t_2\lambda_{11}+\hbar^2 t_2^2\gamma_{21}\lambda_{11}+\hbar t_2\lambda_{21}+\hbar^2 t_2^2\gamma_{21}\lambda_{21}+\hbar t_3\lambda_{31}+\hbar^2 t_2 t_3\gamma_{21}\lambda_{31}\right)}{1+\hbar t_2\gamma_{21}}}+\frac{e^{-\gamma\hbar t_2\lambda_{11}-\gamma\hbar t_2\lambda_{21}-\gamma\hbar t_3\lambda_{31}}\gamma\left(e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar t_2\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar^2 t_2^2\gamma_{21}\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma}\right.}{}$$

$$\gamma\,\hbar^4\,t_2\,x_3^2\,y_{\$135}^2\,\gamma_{11}^2\,\gamma_{23}^2 + 4$$

$$e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}}+\frac{e^{-\gamma \hbar t_2 \lambda_{11}-\gamma \hbar t_2 \lambda_{21}-\gamma \hbar t_3 \lambda_{31}} \gamma \left(e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_2 \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2^2 \gamma_{21} \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}}\right.}{}$$

$$\hbar^2 a_{\$136} x_2 y_3 \gamma_{22} \gamma_{31} - 4 e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}}$$

$$\gamma \hbar^3 x_2 x_{\$137} y_3 y_{\$135} \gamma_{11} \gamma_{22} \gamma_{31} - 2$$

$$e^{\frac{e^{-\gamma \hbar t_2 \lambda_{11}-\gamma \hbar t_2 \lambda_{21}-\gamma \hbar t_3 \lambda_{31}} \gamma \left(e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_2 \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2^2 \gamma_{21} \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_2 \lambda_{22}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2^2 \gamma_{21} \lambda_{22}+e^{\gamma \hbar t_2}\right.}{1+\hbar t_2 \gamma_{21}}}$$

$$\gamma \hbar^3 x_2^2 y_3 y_{\$135} \gamma_{22}^2 \gamma_{31} + 2$$

$$e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}}+\frac{e^{-\gamma \hbar t_2 \lambda_{11}-\gamma \hbar t_2 \lambda_{21}-\gamma \hbar t_3 \lambda_{31}} \gamma \left(e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_2 \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2^2 \gamma_{21} \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}}\right.}{}$$

$$\gamma \hbar^4 t_2 x_2^2 y_3 y_{\$135} \gamma_{11} \gamma_{22}^2 \gamma_{31} + 4$$

$$e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}}+\frac{e^{-\gamma \hbar t_2 \lambda_{11}-\gamma \hbar t_2 \lambda_{21}-\gamma \hbar t_3 \lambda_{31}} \gamma \left(e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_2 \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2^2 \gamma_{21} \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}}\right.}{}$$

$$\hbar^2 a_{\$136} x_3 y_3 \gamma_{23} \gamma_{31} - 4 e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}}$$

$$\gamma \hbar^3 x_3 x_{\$137} y_3 y_{\$135} \gamma_{11} \gamma_{23} \gamma_{31} - 4$$

$$e^{\frac{e^{-\gamma \hbar t_2 \lambda_{11}-\gamma \hbar t_2 \lambda_{21}-\gamma \hbar t_3 \lambda_{31}} \gamma \left(e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_2 \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2^2 \gamma_{21} \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_2 \lambda_{22}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2^2 \gamma_{21} \lambda_{22}+e^{\gamma \hbar t}\right.}{1+\hbar t_2 \gamma_{21}}}$$

$$\gamma \hbar^3 x_2 x_3 y_3 y_{\$135} \gamma_{22} \gamma_{23} \gamma_{31} + 4$$

$$e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}}+\frac{e^{-\gamma \hbar t_2 \lambda_{11}-\gamma \hbar t_2 \lambda_{21}-\gamma \hbar t_3 \lambda_{31}} \gamma \left(e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_2 \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2^2 \gamma_{21} \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}}\right.}{}$$

$$\gamma \hbar^4 t_2 x_2 x_3 y_3 y_{\$135} \gamma_{11} \gamma_{22} \gamma_{23} \gamma_{31} - 2$$

$$e^{\frac{e^{-\gamma \hbar t_2 \lambda_{11}-\gamma \hbar t_2 \lambda_{21}-\gamma \hbar t_3 \lambda_{31}} \gamma \left(e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_2 \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2^2 \gamma_{21} \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_2 \lambda_{22}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2^2 \gamma_{21} \lambda_{22}+e^{\gamma \hbar t}\right.}{1+\hbar t_2 \gamma_{21}}}$$

$$\gamma \hbar^3 x_3^2 y_3 y_{\$135} \gamma_{23}^2 \gamma_{31} + 2$$

$$e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}}+\frac{e^{-\gamma \hbar t_2 \lambda_{11}-\gamma \hbar t_2 \lambda_{21}-\gamma \hbar t_3 \lambda_{31}} \gamma \left(e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_2 \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2^2 \gamma_{21} \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}}\right.}{}$$

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$$\gamma \hbar^4 t_2 x_3^2 y_3 y_{\$135} \gamma_{11} \gamma_{23}^2 \gamma_{31} - 2 e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}}$$

$$\gamma \hbar^3 x_2 x_{\$137} y_3^2 \gamma_{22} \gamma_{31}^2 +$$

$$e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}}+\frac{e^{-\gamma \hbar t_2 \lambda_{11}-\gamma \hbar t_2 \lambda_{21}-\gamma \hbar t_3 \lambda_{31}} \gamma \left(e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_2 \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2^2 \gamma_{21} \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma}\right.}{}$$

$$\gamma \hbar^4 t_2 x_2^2 y_3^2 \gamma_{22}^2 \gamma_{31}^2 - 2 e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}} \gamma \hbar^3 x_3 x_{\$137} y_3^2 \gamma_{23} \gamma_{31}^2 + 2$$

$$e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}}+\frac{e^{-\gamma \hbar t_2 \lambda_{11}-\gamma \hbar t_2 \lambda_{21}-\gamma \hbar t_3 \lambda_{31}} \gamma \left(e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_2 \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2^2 \gamma_{21} \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}}\right.}{}$$

$$\gamma \hbar^4 t_2 x_2 x_3 y_3^2 \gamma_{22} \gamma_{23} \gamma_{31}^2 +$$

$$e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}}+\frac{e^{-\gamma \hbar t_2 \lambda_{11}-\gamma \hbar t_2 \lambda_{21}-\gamma \hbar t_3 \lambda_{31}} \gamma \left(e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_2 \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2^2 \gamma_{21} \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma}\right.}{}$$

$$\left.\gamma \hbar^4 t_2 x_3^2 y_3^2 \gamma_{23}^2 \gamma_{31}^2\right) \epsilon + O[\epsilon]^2,\ e^{(\upsilon\$5088+\omega\$5088)\, a_{n\$5088}} + O[\epsilon]^3\Big\}$$

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$$\mathbb{E}_{CU}\Big[\{y_3, a_3, x_3\}_3, \{y_{\$135}, a_{\$138}, x_{\$137}, x_2\}_2,$$

$$\frac{1}{1+\hbar t_2 \gamma_{21}} e^{-\gamma \hbar t_2 \lambda_{11}-\gamma \hbar t_2 \lambda_{12}-\gamma \hbar t_2 \lambda_{21}-\gamma \hbar t_2 \lambda_{22}-\gamma \hbar t_3 \lambda_{31}-\gamma \hbar t_3 \lambda_{32}} \Big(e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar x_{\$137} y_{\$135} \gamma_{11} +$$

$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar x_2 y_{\$135} \gamma_{12} + e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}}$$

$$\hbar x_3 y_{\$135} \gamma_{13} + \hbar x_{\$137} y_{\$135} \gamma_{21} + e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar^2 t_2 x_2 y_{\$135} \gamma_{12} \gamma_{21} +$$

$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar^2 t_2 x_3 y_{\$135} \gamma_{13} \gamma_{21} + e^{\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{32}} \hbar x_2 y_{\$135} \gamma_{22} -$$

$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar^2 t_2 x_2 y_{\$135} \gamma_{11} \gamma_{22} +$$

$$e^{\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{32}} \hbar x_3 y_{\$135} \gamma_{23} - e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar^2 t_2 x_3 y_{\$135} \gamma_{11} \gamma_{23} +$$

$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar x_{\$137} y_3 \gamma_{31} - e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar^2 t_2 x_2 y_3 \gamma_{22} \gamma_{31} -$$

$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar^2 t_2 x_3 y_3 \gamma_{23} \gamma_{31} +$$

$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar x_2 y_3 \gamma_{32} +$$

$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar^2 t_2 x_2 y_3 \gamma_{21} \gamma_{32} +$$

$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar x_3 y_3 \gamma_{33} + e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}}$$

$$\hbar^2 t_2 x_3 y_3 \gamma_{21} \gamma_{33} + e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar a_{\$138} t_2 \lambda_{11} +$$

$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar^2 a_{\$138} t_2^2 \gamma_{21} \lambda_{11} +$$

$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar a_{\$138} t_2 \lambda_{12} + e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}}$$

$$\hbar^2 a_{\$138} t_2^2 \gamma_{21} \lambda_{12} + e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar a_3 t_2 \lambda_{13} +$$

$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar^2 a_3 t_2^2 \gamma_{21} \lambda_{13} +$$
$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar a_{\$138} t_2 \lambda_{21} + e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}}$$
$$\hbar^2 a_{\$138} t_2^2 \gamma_{21} \lambda_{21} + e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar a_{\$138} t_2 \lambda_{22} +$$
$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar^2 a_{\$138} t_2^2 \gamma_{21} \lambda_{22} +$$
$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar a_3 t_2 \lambda_{23} + e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}}$$
$$\hbar^2 a_3 t_2^2 \gamma_{21} \lambda_{23} + e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar a_{\$138} t_3 \lambda_{31} +$$
$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar^2 a_{\$138} t_2 t_3 \gamma_{21} \lambda_{31} +$$
$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar a_{\$138} t_3 \lambda_{32} +$$
$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar^2 a_{\$138} t_2 t_3 \gamma_{21} \lambda_{32} +$$
$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar a_3 t_3 \lambda_{33} +$$
$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar^2 a_3 t_2 t_3 \gamma_{21} \lambda_{33}\Big), \frac{1}{1+\hbar t_2 \gamma_{21}} + \frac{1}{2\,(1+\hbar t_2 \gamma_{21})}$$

$$e^{-\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}} - \frac{e^{-\gamma \hbar t_2 \lambda_{11}-\gamma \hbar t_2 \lambda_{21}-\gamma \hbar t_3 \lambda_{31}} \gamma \left(e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_2 \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2^2 \gamma_{21} \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{2}\right.}{}$$

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$$e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}} + \frac{e^{-\gamma \hbar t_2 \lambda_{11}-\gamma \hbar t_2 \lambda_{21}-\gamma \hbar t_3 \lambda_{31}} \gamma \left(e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_2 \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2^2 \gamma_{21} \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}}\right.}{}$$
$$\hbar^2 a_{\$138} x_2 y_{\$135} \gamma_{11} \gamma_{22} - 2\, e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}}$$
$$\gamma \hbar^3 x_2 x_{\$137} y_{\$135}^2 \gamma_{11}^2 \gamma_{22} - 2$$
$$e^{\frac{e^{-\gamma \hbar t_2 \lambda_{11}-\gamma \hbar t_2 \lambda_{21}-\gamma \hbar t_3 \lambda_{31}} \gamma \left(e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_2 \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2^2 \gamma_{21} \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_2 \lambda_{22}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2^2 \gamma_{21} \lambda_{22}+e^{\gamma \hbar t}\right.}{1+\hbar t_2 \gamma_{21}}}$$
$$\gamma \hbar^3 x_2^2 y_{\$135}^2 \gamma_{11} \gamma_{22}^2 +$$
$$e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}} + \frac{e^{-\gamma \hbar t_2 \lambda_{11}-\gamma \hbar t_2 \lambda_{21}-\gamma \hbar t_3 \lambda_{31}} \gamma \left(e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_2 \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2^2 \gamma_{21} \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma}\right.}{}$$
$$\gamma \hbar^4 t_2 x_2^2 y_{\$135}^2 \gamma_{11}^2 \gamma_{22}^2 + 4$$
$$e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}} + \frac{e^{-\gamma \hbar t_2 \lambda_{11}-\gamma \hbar t_2 \lambda_{21}-\gamma \hbar t_3 \lambda_{31}} \gamma \left(e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_2 \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2^2 \gamma_{21} \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}}\right.}{}$$
$$\hbar^2 a_{\$138} x_3 y_{\$135} \gamma_{11} \gamma_{23} - 2\, e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}}$$
$$\gamma \hbar^3 x_3 x_{\$137} y_{\$135}^2 \gamma_{11}^2 \gamma_{23} - 4$$
$$e^{\frac{e^{-\gamma \hbar t_2 \lambda_{11}-\gamma \hbar t_2 \lambda_{21}-\gamma \hbar t_3 \lambda_{31}} \gamma \left(e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_2 \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2^2 \gamma_{21} \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_2 \lambda_{22}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2^2 \gamma_{21} \lambda_{22}+e^{\gamma \hbar t}\right.}{1+\hbar t_2 \gamma_{21}}}$$
$$\gamma \hbar^3 x_2 x_3 y_{\$135}^2 \gamma_{11} \gamma_{22} \gamma_{23} + 2$$
$$e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}} + \frac{e^{-\gamma \hbar t_2 \lambda_{11}-\gamma \hbar t_2 \lambda_{21}-\gamma \hbar t_3 \lambda_{31}} \gamma \left(e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_2 \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2^2 \gamma_{21} \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}}\right.}{}$$
$$\gamma \hbar^4 t_2 x_2 x_3 y_{\$135}^2 \gamma_{11}^2 \gamma_{22} \gamma_{23} - 2$$
$$e^{\frac{e^{-\gamma \hbar t_2 \lambda_{11}-\gamma \hbar t_2 \lambda_{21}-\gamma \hbar t_3 \lambda_{31}} \gamma \left(e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_2 \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2^2 \gamma_{21} \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_2 \lambda_{22}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2^2 \gamma_{21} \lambda_{22}+e^{\gamma \hbar t}\right.}{1+\hbar t_2 \gamma_{21}}}$$
$$\gamma \hbar^3 x_3^2 y_{\$135}^2 \gamma_{11} \gamma_{23}^2 +$$
$$e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}} + \frac{e^{-\gamma \hbar t_2 \lambda_{11}-\gamma \hbar t_2 \lambda_{21}-\gamma \hbar t_3 \lambda_{31}} \gamma \left(e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_2 \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2^2 \gamma_{21} \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma}\right.}{}$$
$$\gamma \hbar^4 t_2 x_3^2 y_{\$135}^2 \gamma_{11}^2 \gamma_{23}^2 + 4$$
$$e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}} + \frac{e^{-\gamma \hbar t_2 \lambda_{11}-\gamma \hbar t_2 \lambda_{21}-\gamma \hbar t_3 \lambda_{31}} \gamma \left(e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_2 \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2^2 \gamma_{21} \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}}\right.}{}$$
$$\hbar^2 a_{\$138} x_2 y_3 \gamma_{22} \gamma_{31} - 4\, e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}}$$
$$\gamma \hbar^3 x_2 x_{\$137} y_3 y_{\$135} \gamma_{11} \gamma_{22} \gamma_{31} - 2$$
$$e^{\frac{e^{-\gamma \hbar t_2 \lambda_{11}-\gamma \hbar t_2 \lambda_{21}-\gamma \hbar t_3 \lambda_{31}} \gamma \left(e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_2 \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2^2 \gamma_{21} \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_2 \lambda_{22}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2^2 \gamma_{21} \lambda_{22}+e^{\gamma \hbar t}\right.}{1+\hbar t_2 \gamma_{21}}}$$
$$\gamma \hbar^3 x_2^2 y_3 y_{\$135} \gamma_{22}^2 \gamma_{31} + 2$$
$$e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}} + \frac{e^{-\gamma \hbar t_2 \lambda_{11}-\gamma \hbar t_2 \lambda_{21}-\gamma \hbar t_3 \lambda_{31}} \gamma \left(e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_2 \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2^2 \gamma_{21} \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}}\right.}{}$$
$$\gamma \hbar^4 t_2 x_2^2 y_3 y_{\$135} \gamma_{11} \gamma_{22}^2 \gamma_{31} + 4$$
$$e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}} + \frac{e^{-\gamma \hbar t_2 \lambda_{11}-\gamma \hbar t_2 \lambda_{21}-\gamma \hbar t_3 \lambda_{31}} \gamma \left(e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_2 \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2^2 \gamma_{21} \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}}\right.}{}$$
$$\hbar^2 a_{\$138} x_3 y_3 \gamma_{23} \gamma_{31} - 4\, e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}}$$

$$\gamma\,\hbar^3\,x_3\,x_{\$137}\,y_3\,y_{\$135}\,\gamma_{11}\,\gamma_{23}\,\gamma_{31} - 4\,e^{\frac{e^{-\gamma\hbar t_2\lambda_{11}-\gamma\hbar t_2\lambda_{21}-\gamma\hbar t_3\lambda_{31}}\gamma\left(e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar t_2\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar^2 t_2^2\gamma_{21}\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar t_2\lambda_{22}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar^2 t_2^2\gamma_{21}\lambda_{22}+e^{\gamma\hbar t}\right.}{1+\hbar t_2\gamma_{21}}}$$

$$\gamma\,\hbar^3\,x_2\,x_3\,y_3\,y_{\$135}\,\gamma_{22}\,\gamma_{23}\,\gamma_{31} + 4\,e^{\frac{\gamma\left(\hbar t_2\lambda_{11}+\hbar^2 t_2^2\gamma_{21}\lambda_{11}+\hbar t_2\lambda_{21}+\hbar^2 t_2^2\gamma_{21}\lambda_{21}+\hbar t_3\lambda_{31}+\hbar^2 t_2 t_3\gamma_{21}\lambda_{31}\right)}{1+\hbar t_2\gamma_{21}}}+\frac{e^{-\gamma\hbar t_2\lambda_{11}-\gamma\hbar t_2\lambda_{21}-\gamma\hbar t_3\lambda_{31}}\gamma\left(e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar t_2\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar^2 t_2^2\gamma_{21}\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}}\right.}{}$$

$$\gamma\,\hbar^4\,t_2\,x_2\,x_3\,y_3\,y_{\$135}\,\gamma_{11}\,\gamma_{22}\,\gamma_{23}\,\gamma_{31} - 2\,e^{\frac{e^{-\gamma\hbar t_2\lambda_{11}-\gamma\hbar t_2\lambda_{21}-\gamma\hbar t_3\lambda_{31}}\gamma\left(e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar t_2\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar^2 t_2^2\gamma_{21}\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar t_2\lambda_{22}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar^2 t_2^2\gamma_{21}\lambda_{22}+e^{\gamma\hbar t}\right.}{1+\hbar t_2\gamma_{21}}}$$

$$\gamma\,\hbar^3\,x_3^2\,y_3\,y_{\$135}\,\gamma_{23}^2\,\gamma_{31} + 2\,e^{\frac{\gamma\left(\hbar t_2\lambda_{11}+\hbar^2 t_2^2\gamma_{21}\lambda_{11}+\hbar t_2\lambda_{21}+\hbar^2 t_2^2\gamma_{21}\lambda_{21}+\hbar t_3\lambda_{31}+\hbar^2 t_2 t_3\gamma_{21}\lambda_{31}\right)}{1+\hbar t_2\gamma_{21}}}+\frac{e^{-\gamma\hbar t_2\lambda_{11}-\gamma\hbar t_2\lambda_{21}-\gamma\hbar t_3\lambda_{31}}\gamma\left(e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar t_2\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar^2 t_2^2\gamma_{21}\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}}\right.}{}$$

$$\gamma\,\hbar^4\,t_2\,x_3^2\,y_3\,y_{\$135}\,\gamma_{11}\,\gamma_{23}^2\,\gamma_{31} - 2\,e^{\frac{\gamma\left(\hbar t_2\lambda_{11}+\hbar^2 t_2^2\gamma_{21}\lambda_{11}+\hbar t_2\lambda_{21}+\hbar^2 t_2^2\gamma_{21}\lambda_{21}+\hbar t_3\lambda_{31}+\hbar^2 t_2 t_3\gamma_{21}\lambda_{31}\right)}{1+\hbar t_2\gamma_{21}}}$$

$$\gamma\,\hbar^3\,x_2\,x_{\$137}\,y_3^2\,\gamma_{22}\,\gamma_{31}^2 +$$

$$e^{\frac{\gamma\left(\hbar t_2\lambda_{11}+\hbar^2 t_2^2\gamma_{21}\lambda_{11}+\hbar t_2\lambda_{21}+\hbar^2 t_2^2\gamma_{21}\lambda_{21}+\hbar t_3\lambda_{31}+\hbar^2 t_2 t_3\gamma_{21}\lambda_{31}\right)}{1+\hbar t_2\gamma_{21}}}+\frac{e^{-\gamma\hbar t_2\lambda_{11}-\gamma\hbar t_2\lambda_{21}-\gamma\hbar t_3\lambda_{31}}\gamma\left(e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar t_2\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar^2 t_2^2\gamma_{21}\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma}\right.}{}$$

$$\gamma\,\hbar^4\,t_2\,x_2^2\,y_3^2\,\gamma_{22}^2\,\gamma_{31}^2 - 2\,e^{\frac{\gamma\left(\hbar t_2\lambda_{11}+\hbar^2 t_2^2\gamma_{21}\lambda_{11}+\hbar t_2\lambda_{21}+\hbar^2 t_2^2\gamma_{21}\lambda_{21}+\hbar t_3\lambda_{31}+\hbar^2 t_2 t_3\gamma_{21}\lambda_{31}\right)}{1+\hbar t_2\gamma_{21}}}\,\gamma\,\hbar^3\,x_3\,x_{\$137}\,y_3^2\,\gamma_{23}\,\gamma_{31}^2 + 2$$

$$e^{\frac{\gamma\left(\hbar t_2\lambda_{11}+\hbar^2 t_2^2\gamma_{21}\lambda_{11}+\hbar t_2\lambda_{21}+\hbar^2 t_2^2\gamma_{21}\lambda_{21}+\hbar t_3\lambda_{31}+\hbar^2 t_2 t_3\gamma_{21}\lambda_{31}\right)}{1+\hbar t_2\gamma_{21}}}+\frac{e^{-\gamma\hbar t_2\lambda_{11}-\gamma\hbar t_2\lambda_{21}-\gamma\hbar t_3\lambda_{31}}\gamma\left(e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar t_2\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar^2 t_2^2\gamma_{21}\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}}\right.}{}$$

$$\gamma\,\hbar^4\,t_2\,x_2\,x_3\,y_3^2\,\gamma_{22}\,\gamma_{23}\,\gamma_{31}^2 +$$

$$e^{\frac{\gamma\left(\hbar t_2\lambda_{11}+\hbar^2 t_2^2\gamma_{21}\lambda_{11}+\hbar t_2\lambda_{21}+\hbar^2 t_2^2\gamma_{21}\lambda_{21}+\hbar t_3\lambda_{31}+\hbar^2 t_2 t_3\gamma_{21}\lambda_{31}\right)}{1+\hbar t_2\gamma_{21}}}+\frac{e^{-\gamma\hbar t_2\lambda_{11}-\gamma\hbar t_2\lambda_{21}-\gamma\hbar t_3\lambda_{31}}\gamma\left(e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar t_2\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar^2 t_2^2\gamma_{21}\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma}\right.}{}$$

$$\left.\gamma\,\hbar^4\,t_2\,x_3^2\,y_3^2\,\gamma_{23}^2\,\gamma_{31}^2\right)\epsilon + O[\epsilon]^2\Big]$$

» $$\left\{\left\{\left\{x_{\$137},\ \upsilon\$5098\right\},\ \left\{x_2,\ \omega\$5098\right\}\right\},\ \frac{1}{1+\hbar t_2\gamma_{21}}+\frac{1}{2\,(1+\hbar t_2\gamma_{21})}\right.$$

$$e^{-\frac{\gamma\left(\hbar t_2\lambda_{11}+\hbar^2 t_2^2\gamma_{21}\lambda_{11}+\hbar t_2\lambda_{21}+\hbar^2 t_2^2\gamma_{21}\lambda_{21}+\hbar t_3\lambda_{31}+\hbar^2 t_2 t_3\gamma_{21}\lambda_{31}\right)}{1+\hbar t_2\gamma_{21}}}-\frac{e^{-\gamma\hbar t_2\lambda_{11}-\gamma\hbar t_2\lambda_{21}-\gamma\hbar t_3\lambda_{31}}\gamma\left(e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar t_2\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar^2 t_2^2\gamma_{21}\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{2}}\right.}{}$$

$$\Big(4$$

$$e^{\frac{\gamma\left(\hbar t_2\lambda_{11}+\hbar^2 t_2^2\gamma_{21}\lambda_{11}+\hbar t_2\lambda_{21}+\hbar^2 t_2^2\gamma_{21}\lambda_{21}+\hbar t_3\lambda_{31}+\hbar^2 t_2 t_3\gamma_{21}\lambda_{31}\right)}{1+\hbar t_2\gamma_{21}}}+\frac{e^{-\gamma\hbar t_2\lambda_{11}-\gamma\hbar t_2\lambda_{21}-\gamma\hbar t_3\lambda_{31}}\gamma\left(e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar t_2\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar^2 t_2^2\gamma_{21}\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}}\right.}{}$$

$$\hbar^2\,a_{\$138}\,x_2\,y_{\$135}\,\gamma_{11}\,\gamma_{22} - 2\,e^{\frac{\gamma\left(\hbar t_2\lambda_{11}+\hbar^2 t_2^2\gamma_{21}\lambda_{11}+\hbar t_2\lambda_{21}+\hbar^2 t_2^2\gamma_{21}\lambda_{21}+\hbar t_3\lambda_{31}+\hbar^2 t_2 t_3\gamma_{21}\lambda_{31}\right)}{1+\hbar t_2\gamma_{21}}}$$

$$\gamma\,\hbar^3\,x_2\,x_{\$137}\,y_{\$135}^2\,\gamma_{11}^2\,\gamma_{22} - 2$$

$$e^{\frac{e^{-\gamma\hbar t_2\lambda_{11}-\gamma\hbar t_2\lambda_{21}-\gamma\hbar t_3\lambda_{31}}\gamma\left(e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar t_2\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar^2 t_2^2\gamma_{21}\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar t_2\lambda_{22}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar^2 t_2^2\gamma_{21}\lambda_{22}+e^{\gamma\hbar t}\right.}{1+\hbar t_2\gamma_{21}}}$$

$$\gamma\,\hbar^3\,x_2^2\,y_{\$135}^2\,\gamma_{11}\,\gamma_{22}^2 +$$

$$e^{\frac{\gamma\left(\hbar t_2\lambda_{11}+\hbar^2 t_2^2\gamma_{21}\lambda_{11}+\hbar t_2\lambda_{21}+\hbar^2 t_2^2\gamma_{21}\lambda_{21}+\hbar t_3\lambda_{31}+\hbar^2 t_2 t_3\gamma_{21}\lambda_{31}\right)}{1+\hbar t_2\gamma_{21}}}+\frac{e^{-\gamma\hbar t_2\lambda_{11}-\gamma\hbar t_2\lambda_{21}-\gamma\hbar t_3\lambda_{31}}\gamma\left(e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar t_2\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar^2 t_2^2\gamma_{21}\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma}\right.}{}$$

$$\gamma\,\hbar^4\,t_2\,x_2^2\,y_{\$135}^2\,\gamma_{11}^2\,\gamma_{22}^2 + 4$$

$$e^{\frac{\gamma\left(\hbar t_2\lambda_{11}+\hbar^2 t_2^2\gamma_{21}\lambda_{11}+\hbar t_2\lambda_{21}+\hbar^2 t_2^2\gamma_{21}\lambda_{21}+\hbar t_3\lambda_{31}+\hbar^2 t_2 t_3\gamma_{21}\lambda_{31}\right)}{1+\hbar t_2\gamma_{21}}}+\frac{e^{-\gamma\hbar t_2\lambda_{11}-\gamma\hbar t_2\lambda_{21}-\gamma\hbar t_3\lambda_{31}}\gamma\left(e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar t_2\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar^2 t_2^2\gamma_{21}\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}}\right.}{}$$

$$\hbar^2\,a_{\$138}\,x_3\,y_{\$135}\,\gamma_{11}\,\gamma_{23} - 2\,e^{\frac{\gamma\left(\hbar t_2\lambda_{11}+\hbar^2 t_2^2\gamma_{21}\lambda_{11}+\hbar t_2\lambda_{21}+\hbar^2 t_2^2\gamma_{21}\lambda_{21}+\hbar t_3\lambda_{31}+\hbar^2 t_2 t_3\gamma_{21}\lambda_{31}\right)}{1+\hbar t_2\gamma_{21}}}$$

$$\gamma\,\hbar^3\,x_3\,x_{\$137}\,y_{\$135}^2\,\gamma_{11}^2\,\gamma_{23} - 4$$

$$e^{\frac{e^{-\gamma\hbar t_2\lambda_{11}-\gamma\hbar t_2\lambda_{21}-\gamma\hbar t_3\lambda_{31}}\gamma\left(e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar t_2\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar^2 t_2^2\gamma_{21}\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar t_2\lambda_{22}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar^2 t_2^2\gamma_{21}\lambda_{22}+e^{\gamma\hbar t}\right.}{1+\hbar t_2\gamma_{21}}}$$

$$\gamma\,\hbar^3\,x_2\,x_3\,y_{\$135}^2\,\gamma_{11}\,\gamma_{22}\,\gamma_{23} + 2$$

$$e^{\frac{\gamma\left(\hbar t_2\lambda_{11}+\hbar^2 t_2^2\gamma_{21}\lambda_{11}+\hbar t_2\lambda_{21}+\hbar^2 t_2^2\gamma_{21}\lambda_{21}+\hbar t_3\lambda_{31}+\hbar^2 t_2 t_3\gamma_{21}\lambda_{31}\right)}{1+\hbar t_2\gamma_{21}}}+\frac{e^{-\gamma\hbar t_2\lambda_{11}-\gamma\hbar t_2\lambda_{21}-\gamma\hbar t_3\lambda_{31}}\gamma\left(e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar t_2\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar^2 t_2^2\gamma_{21}\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}}\right.}{}$$

$$\gamma\,\hbar^4\,t_2\,x_2\,x_3\,y_{\$135}^2\,\gamma_{11}^2\,\gamma_{22}\,\gamma_{23} - 2$$

$$e^{\frac{e^{-\gamma\hbar t_2\lambda_{11}-\gamma\hbar t_2\lambda_{21}-\gamma\hbar t_3\lambda_{31}}\gamma\left(e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar t_2\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar^2 t_2^2\gamma_{21}\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar t_2\lambda_{22}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar^2 t_2^2\gamma_{21}\lambda_{22}+e^{\gamma\hbar t}\right.}{1+\hbar t_2\gamma_{21}}}$$

$$\gamma\,\hbar^3\,x_3^2\,y_{\$135}^2\,\gamma_{11}\,\gamma_{23}^2 +$$

$$e^{\frac{\gamma\left(\hbar t_2\lambda_{11}+\hbar^2 t_2^2\gamma_{21}\lambda_{11}+\hbar t_2\lambda_{21}+\hbar^2 t_2^2\gamma_{21}\lambda_{21}+\hbar t_3\lambda_{31}+\hbar^2 t_2 t_3\gamma_{21}\lambda_{31}\right)}{1+\hbar t_2\gamma_{21}}}+\frac{e^{-\gamma\hbar t_2\lambda_{11}-\gamma\hbar t_2\lambda_{21}-\gamma\hbar t_3\lambda_{31}}\gamma\left(e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar t_2\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar^2 t_2^2\gamma_{21}\lambda_{12}+e^{\gamma\hbar t_2\lambda_{11}+\gamma}\right.}{}$$

$$\gamma\,\hbar^4\,t_2\,x_3^2\,y_{\$135}^2\,\gamma_{11}^2\,\gamma_{23}^2 + 4$$

$$e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}}+\frac{e^{-\gamma \hbar t_2 \lambda_{11}-\gamma \hbar t_2 \lambda_{21}-\gamma \hbar t_3 \lambda_{31}} \gamma \left(e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_2 \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2^2 \gamma_{21} \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}}\right.}{}$$

$$\hbar^2 a_{\$138} x_2 y_3 \gamma_{22} \gamma_{31} - 4 e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}}$$

$$\gamma \hbar^3 x_2 x_{\$137} y_3 y_{\$135} \gamma_{11} \gamma_{22} \gamma_{31} - 2$$

$$e^{\frac{e^{-\gamma \hbar t_2 \lambda_{11}-\gamma \hbar t_2 \lambda_{21}-\gamma \hbar t_3 \lambda_{31}} \gamma \left(e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_2 \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2^2 \gamma_{21} \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_2 \lambda_{22}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2^2 \gamma_{21} \lambda_{22}+e^{\gamma \hbar t}\right.}{1+\hbar t_2 \gamma_{21}}}$$

$$\gamma \hbar^3 x_2^2 y_3 y_{\$135} \gamma_{22}^2 \gamma_{31} + 2$$

$$e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}}+\frac{e^{-\gamma \hbar t_2 \lambda_{11}-\gamma \hbar t_2 \lambda_{21}-\gamma \hbar t_3 \lambda_{31}} \gamma \left(e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_2 \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2^2 \gamma_{21} \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}}\right.}{}$$

$$\gamma \hbar^4 t_2 x_2^2 y_3 y_{\$135} \gamma_{11} \gamma_{22}^2 \gamma_{31} + 4$$

$$e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}}+\frac{e^{-\gamma \hbar t_2 \lambda_{11}-\gamma \hbar t_2 \lambda_{21}-\gamma \hbar t_3 \lambda_{31}} \gamma \left(e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_2 \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2^2 \gamma_{21} \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}}\right.}{}$$

$$\hbar^2 a_{\$138} x_3 y_3 \gamma_{23} \gamma_{31} - 4 e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}}$$

$$\gamma \hbar^3 x_3 x_{\$137} y_3 y_{\$135} \gamma_{11} \gamma_{23} \gamma_{31} - 4$$

$$e^{\frac{e^{-\gamma \hbar t_2 \lambda_{11}-\gamma \hbar t_2 \lambda_{21}-\gamma \hbar t_3 \lambda_{31}} \gamma \left(e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_2 \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2^2 \gamma_{21} \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_2 \lambda_{22}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2^2 \gamma_{21} \lambda_{22}+e^{\gamma \hbar t}\right.}{1+\hbar t_2 \gamma_{21}}}$$

$$\gamma \hbar^3 x_2 x_3 y_3 y_{\$135} \gamma_{22} \gamma_{23} \gamma_{31} + 4$$

$$e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}}+\frac{e^{-\gamma \hbar t_2 \lambda_{11}-\gamma \hbar t_2 \lambda_{21}-\gamma \hbar t_3 \lambda_{31}} \gamma \left(e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_2 \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2^2 \gamma_{21} \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}}\right.}{}$$

$$\gamma \hbar^4 t_2 x_2 x_3 y_3 y_{\$135} \gamma_{11} \gamma_{22} \gamma_{23} \gamma_{31} - 2$$

$$e^{\frac{e^{-\gamma \hbar t_2 \lambda_{11}-\gamma \hbar t_2 \lambda_{21}-\gamma \hbar t_3 \lambda_{31}} \gamma \left(e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_2 \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2^2 \gamma_{21} \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_2 \lambda_{22}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2^2 \gamma_{21} \lambda_{22}+e^{\gamma \hbar t}\right.}{1+\hbar t_2 \gamma_{21}}}$$

$$\gamma \hbar^3 x_3^2 y_3 y_{\$135} \gamma_{23}^2 \gamma_{31} + 2$$

$$e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}}+\frac{e^{-\gamma \hbar t_2 \lambda_{11}-\gamma \hbar t_2 \lambda_{21}-\gamma \hbar t_3 \lambda_{31}} \gamma \left(e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_2 \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2^2 \gamma_{21} \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}}\right.}{}$$

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$$\gamma \hbar^4 t_2 x_3^2 y_3 y_{\$135} \gamma_{11} \gamma_{23}^2 \gamma_{31} - 2 e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}}$$

$$\gamma \hbar^3 x_2 x_{\$137} y_3^2 \gamma_{22} \gamma_{31}^2 +$$

$$e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}}+\frac{e^{-\gamma \hbar t_2 \lambda_{11}-\gamma \hbar t_2 \lambda_{21}-\gamma \hbar t_3 \lambda_{31}} \gamma \left(e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_2 \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2^2 \gamma_{21} \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma}\right.}{}$$

$$\gamma \hbar^4 t_2 x_2^2 y_3^2 \gamma_{22}^2 \gamma_{31}^2 - 2 e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}} \gamma \hbar^3 x_3 x_{\$137} y_3^2 \gamma_{23} \gamma_{31}^2 + 2$$

$$e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}}+\frac{e^{-\gamma \hbar t_2 \lambda_{11}-\gamma \hbar t_2 \lambda_{21}-\gamma \hbar t_3 \lambda_{31}} \gamma \left(e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_2 \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2^2 \gamma_{21} \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}}\right.}{}$$

$$\gamma \hbar^4 t_2 x_2 x_3 y_3^2 \gamma_{22} \gamma_{23} \gamma_{31}^2 +$$

$$e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}}+\frac{e^{-\gamma \hbar t_2 \lambda_{11}-\gamma \hbar t_2 \lambda_{21}-\gamma \hbar t_3 \lambda_{31}} \gamma \left(e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_2 \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2^2 \gamma_{21} \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma}\right.}{}$$

$$\left.\gamma \hbar^4 t_2 x_3^2 y_3^2 \gamma_{23}^2 \gamma_{31}^2\right) \epsilon + O[\epsilon]^2,\ e^{(\upsilon\$5098+\omega\$5098)\, x_{n\$5098}} + O[\epsilon]^3\Big\}$$

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$$\text{Œ}_{CU}\Big[\{y_3, a_3, x_3\}_3, \{y_{\$135}, a_{\$138}, x_{\$139}\}_2, \frac{1}{1+\hbar t_2 \gamma_{21}} e^{-\gamma \hbar t_2 \lambda_{11}-\gamma \hbar t_2 \lambda_{12}-\gamma \hbar t_2 \lambda_{21}-\gamma \hbar t_2 \lambda_{22}-\gamma \hbar t_3 \lambda_{31}-\gamma \hbar t_3 \lambda_{32}}$$

$$\Big(e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar x_{\$139} y_{\$135} \gamma_{11} + e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar x_{\$139} y_{\$135} \gamma_{12} +$$

$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar x_3 y_{\$135} \gamma_{13} + \hbar x_{\$139} y_{\$135} \gamma_{21} +$$

$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar^2 t_2 x_{\$139} y_{\$135} \gamma_{12} \gamma_{21} +$$

$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar^2 t_2 x_3 y_{\$135} \gamma_{13} \gamma_{21} + e^{\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{32}}$$

$$\hbar x_{\$139} y_{\$135} \gamma_{22} - e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar^2 t_2 x_{\$139} y_{\$135} \gamma_{11} \gamma_{22} +$$

$$e^{\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{32}} \hbar x_3 y_{\$135} \gamma_{23} - e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar^2 t_2 x_3 y_{\$135} \gamma_{11} \gamma_{23} +$$

$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar x_{\$139} y_3 \gamma_{31} - e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar^2 t_2 x_{\$139} y_3 \gamma_{22} \gamma_{31} -$$

$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar^2 t_2 x_3 y_3 \gamma_{23} \gamma_{31} +$$

$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar x_{\$139} y_3 \gamma_{32} +$$

$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar^2 t_2 x_{\$139} y_3 \gamma_{21} \gamma_{32} +$$

$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar x_3 y_3 \gamma_{33} + e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}}$$

$$\hbar^2 t_2 x_3 y_3 \gamma_{21} \gamma_{33} + e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar a_{\$138} t_2 \lambda_{11} +$$

$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar^2 a_{\$138} t_2^2 \gamma_{21} \lambda_{11} +$$

$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar a_{\$138} t_2 \lambda_{12} +$$

$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar^2 a_{\$138} t_2^2 \gamma_{21} \lambda_{12} +$$

$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar a_3 t_2 \lambda_{13} +$$
$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar^2 a_3 t_2^2 \gamma_{21} \lambda_{13} +$$
$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar a_{\$138} t_2 \lambda_{21} +$$
$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar^2 a_{\$138} t_2^2 \gamma_{21} \lambda_{21} +$$
$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar a_{\$138} t_2 \lambda_{22} +$$
$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar^2 a_{\$138} t_2^2 \gamma_{21} \lambda_{22} +$$
$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar a_3 t_2 \lambda_{23} +$$
$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar^2 a_3 t_2^2 \gamma_{21} \lambda_{23} +$$
$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar a_{\$138} t_3 \lambda_{31} +$$
$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar^2 a_{\$138} t_2 t_3 \gamma_{21} \lambda_{31} +$$
$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar a_{\$138} t_3 \lambda_{32} +$$
$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar^2 a_{\$138} t_2 t_3 \gamma_{21} \lambda_{32} +$$
$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar a_3 t_3 \lambda_{33} +$$
$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar^2 a_3 t_2 t_3 \gamma_{21} \lambda_{33}\Big), \frac{1}{1+\hbar t_2 \gamma_{21}} + \frac{1}{2\,(1+\hbar t_2 \gamma_{21})}$$

$$e^{-\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}} - \frac{e^{-\gamma \hbar t_2 \lambda_{11}-\gamma \hbar t_2 \lambda_{21}-\gamma \hbar t_3 \lambda_{31}} \gamma \left(e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_2 \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2^2 \gamma_{21} \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{2}}\right.}{}}$$

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$$e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}} + \frac{e^{-\gamma \hbar t_2 \lambda_{11}-\gamma \hbar t_2 \lambda_{21}-\gamma \hbar t_3 \lambda_{31}} \gamma \left(e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_2 \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2^2 \gamma_{21} \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}}\right.}{}}$$

$$\hbar^2 a_{\$138} x_{\$139} y_{\$135} \gamma_{11} \gamma_{22} - 2\, e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}}$$
$$\gamma \hbar^3 x_{\$139}^2 y_{\$135}^2 \gamma_{11}^2 \gamma_{22} - 2$$
$$e^{\frac{e^{-\gamma \hbar t_2 \lambda_{11}-\gamma \hbar t_2 \lambda_{21}-\gamma \hbar t_3 \lambda_{31}} \gamma \left(e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_2 \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2^2 \gamma_{21} \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_2 \lambda_{22}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2^2 \gamma_{21} \lambda_{22}+e^{\gamma \hbar t}}{1+\hbar t_2 \gamma_{21}}}$$
$$\gamma \hbar^3 x_{\$139}^2 y_{\$135}^2 \gamma_{11}^2 \gamma_{22}^2 +$$
$$e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}} + \frac{e^{-\gamma \hbar t_2 \lambda_{11}-\gamma \hbar t_2 \lambda_{21}-\gamma \hbar t_3 \lambda_{31}} \gamma \left(e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_2 \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2^2 \gamma_{21} \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma}\right.}{}}$$
$$\gamma \hbar^4 t_2 x_{\$139}^2 y_{\$135}^2 \gamma_{11}^2 \gamma_{22}^2 + 4$$
$$e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}} + \frac{e^{-\gamma \hbar t_2 \lambda_{11}-\gamma \hbar t_2 \lambda_{21}-\gamma \hbar t_3 \lambda_{31}} \gamma \left(e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_2 \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2^2 \gamma_{21} \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}}\right.}{}}$$

$$\hbar^2 a_{\$138} x_3 y_{\$135} \gamma_{11} \gamma_{23} - 2\, e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}}$$
$$\gamma \hbar^3 x_3 x_{\$139} y_{\$135}^2 \gamma_{11}^2 \gamma_{23} - 4$$
$$e^{\frac{e^{-\gamma \hbar t_2 \lambda_{11}-\gamma \hbar t_2 \lambda_{21}-\gamma \hbar t_3 \lambda_{31}} \gamma \left(e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_2 \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2^2 \gamma_{21} \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_2 \lambda_{22}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2^2 \gamma_{21} \lambda_{22}+e^{\gamma \hbar t}}{1+\hbar t_2 \gamma_{21}}}$$
$$\gamma \hbar^3 x_3 x_{\$139} y_{\$135}^2 \gamma_{11} \gamma_{22} \gamma_{23} + 2$$
$$e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}} + \frac{e^{-\gamma \hbar t_2 \lambda_{11}-\gamma \hbar t_2 \lambda_{21}-\gamma \hbar t_3 \lambda_{31}} \gamma \left(e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_2 \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2^2 \gamma_{21} \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}}\right.}{}}$$
$$\gamma \hbar^4 t_2 x_3 x_{\$139} y_{\$135}^2 \gamma_{11}^2 \gamma_{22} \gamma_{23} - 2$$
$$e^{\frac{e^{-\gamma \hbar t_2 \lambda_{11}-\gamma \hbar t_2 \lambda_{21}-\gamma \hbar t_3 \lambda_{31}} \gamma \left(e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_2 \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2^2 \gamma_{21} \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_2 \lambda_{22}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2^2 \gamma_{21} \lambda_{22}+e^{\gamma \hbar t}}{1+\hbar t_2 \gamma_{21}}}$$
$$\gamma \hbar^3 x_3^2 y_{\$135}^2 \gamma_{11} \gamma_{23}^2 +$$
$$e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}} + \frac{e^{-\gamma \hbar t_2 \lambda_{11}-\gamma \hbar t_2 \lambda_{21}-\gamma \hbar t_3 \lambda_{31}} \gamma \left(e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_2 \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2^2 \gamma_{21} \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma}\right.}{}}$$
$$\gamma \hbar^4 t_2 x_3^2 y_{\$135}^2 \gamma_{11}^2 \gamma_{23}^2 + 4$$
$$e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}} + \frac{e^{-\gamma \hbar t_2 \lambda_{11}-\gamma \hbar t_2 \lambda_{21}-\gamma \hbar t_3 \lambda_{31}} \gamma \left(e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_2 \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2^2 \gamma_{21} \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}}\right.}{}}$$

$$\hbar^2 a_{\$138} x_{\$139} y_3 \gamma_{22} \gamma_{31} - 4\, e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}}$$
$$\gamma \hbar^3 x_{\$139}^2 y_3 y_{\$135} \gamma_{11} \gamma_{22} \gamma_{31} - 2$$
$$e^{\frac{e^{-\gamma \hbar t_2 \lambda_{11}-\gamma \hbar t_2 \lambda_{21}-\gamma \hbar t_3 \lambda_{31}} \gamma \left(e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_2 \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2^2 \gamma_{21} \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_2 \lambda_{22}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2^2 \gamma_{21} \lambda_{22}+e^{\gamma \hbar t}}{1+\hbar t_2 \gamma_{21}}}$$
$$\gamma \hbar^3 x_{\$139}^2 y_3 y_{\$135} \gamma_{22}^2 \gamma_{31} + 2$$
$$e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}} + \frac{e^{-\gamma \hbar t_2 \lambda_{11}-\gamma \hbar t_2 \lambda_{21}-\gamma \hbar t_3 \lambda_{31}} \gamma \left(e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_2 \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2^2 \gamma_{21} \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}}\right.}{}}$$
$$\gamma \hbar^4 t_2 x_{\$139}^2 y_3 y_{\$135} \gamma_{11} \gamma_{22}^2 \gamma_{31} + 4$$

$$e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}}+\frac{e^{-\gamma \hbar t_2 \lambda_{11}-\gamma \hbar t_2 \lambda_{21}-\gamma \hbar t_3 \lambda_{31} \gamma \left(e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_2 \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2^2 \gamma_{21} \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}}\right.}{}$$

$$\hbar^2 a_{\$138} x_3 y_3 \gamma_{23} \gamma_{31} - 4 e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}}$$

$$\gamma \hbar^3 x_3 x_{\$139} y_3 y_{\$135} \gamma_{11} \gamma_{23} \gamma_{31} - 4$$

$$e^{\frac{e^{-\gamma \hbar t_2 \lambda_{11}-\gamma \hbar t_2 \lambda_{21}-\gamma \hbar t_3 \lambda_{31} \gamma \left(e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_2 \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2^2 \gamma_{21} \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_2 \lambda_{22}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2^2 \gamma_{21} \lambda_{22}+e^{\gamma \hbar t}\right.}{1+\hbar t_2 \gamma_{21}}}$$

$$\gamma \hbar^3 x_3 x_{\$139} y_3 y_{\$135} \gamma_{22} \gamma_{23} \gamma_{31} + 4$$

$$e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}}+\frac{e^{-\gamma \hbar t_2 \lambda_{11}-\gamma \hbar t_2 \lambda_{21}-\gamma \hbar t_3 \lambda_{31} \gamma \left(e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_2 \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2^2 \gamma_{21} \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}}\right.}{}$$

$$\gamma \hbar^4 t_2 x_3 x_{\$139} y_3 y_{\$135} \gamma_{11} \gamma_{22} \gamma_{23} \gamma_{31} - 2$$

$$e^{\frac{e^{-\gamma \hbar t_2 \lambda_{11}-\gamma \hbar t_2 \lambda_{21}-\gamma \hbar t_3 \lambda_{31} \gamma \left(e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_2 \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2^2 \gamma_{21} \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_2 \lambda_{22}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2^2 \gamma_{21} \lambda_{22}+e^{\gamma \hbar t}\right.}{1+\hbar t_2 \gamma_{21}}}$$

$$\gamma \hbar^3 x_3^2 y_3 y_{\$135} \gamma_{23}^2 \gamma_{31} + 2$$

$$e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}}+\frac{e^{-\gamma \hbar t_2 \lambda_{11}-\gamma \hbar t_2 \lambda_{21}-\gamma \hbar t_3 \lambda_{31} \gamma \left(e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_2 \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2^2 \gamma_{21} \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}}\right.}{}$$

$$\gamma \hbar^4 t_2 x_3^2 y_3 y_{\$135} \gamma_{11} \gamma_{23}^2 \gamma_{31} - 2 e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}} \gamma \hbar^3 x_{\$139}^2 y_3^2 \gamma_{22} \gamma_{31}^2 +$$

$$e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}}+\frac{e^{-\gamma \hbar t_2 \lambda_{11}-\gamma \hbar t_2 \lambda_{21}-\gamma \hbar t_3 \lambda_{31} \gamma \left(e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_2 \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2^2 \gamma_{21} \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma}\right.}{}$$

$$\gamma \hbar^4 t_2 x_{\$139}^2 y_3^2 \gamma_{22}^2 \gamma_{31}^2 - 2 e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}} \gamma \hbar^3 x_3 x_{\$139} y_3^2 \gamma_{23} \gamma_{31}^2 + 2$$

$$e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}}+\frac{e^{-\gamma \hbar t_2 \lambda_{11}-\gamma \hbar t_2 \lambda_{21}-\gamma \hbar t_3 \lambda_{31} \gamma \left(e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_2 \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2^2 \gamma_{21} \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}}\right.}{}$$

$$\gamma \hbar^4 t_2 x_3 x_{\$139} y_3^2 \gamma_{22} \gamma_{23} \gamma_{31}^2 +$$

$$e^{\frac{\gamma\left(\hbar t_2 \lambda_{11}+\hbar^2 t_2^2 \gamma_{21} \lambda_{11}+\hbar t_2 \lambda_{21}+\hbar^2 t_2^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_2 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_2 \gamma_{21}}}+\frac{e^{-\gamma \hbar t_2 \lambda_{11}-\gamma \hbar t_2 \lambda_{21}-\gamma \hbar t_3 \lambda_{31} \gamma \left(e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_2 \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2^2 \gamma_{21} \lambda_{12}+e^{\gamma \hbar t_2 \lambda_{11}+\gamma}\right.}{}$$

$$\left.\gamma \hbar^4 t_2 x_3^2 y_3^2 \gamma_{23}^2 \gamma_{31}^2\right) \epsilon + O[\epsilon]^2\Big]$$

$$\text{Œ}_{CU}\Big[\{y_1, a_1, x_1\}_1, \{y_3, a_3, x_3\}_3, \frac{1}{1+\hbar t_1 \gamma_{21}} e^{-\gamma \hbar t_1 \lambda_{11}-\gamma \hbar t_1 \lambda_{12}-\gamma \hbar t_1 \lambda_{21}-\gamma \hbar t_1 \lambda_{22}-\gamma \hbar t_3 \lambda_{31}-\gamma \hbar t_3 \lambda_{32}}$$

$$\Big(e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar x_1 y_1 \gamma_{11} + e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{12}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_1 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar x_1 y_1 \gamma_{12} +$$

$$e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{12}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_1 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar x_3 y_1 \gamma_{13} + \hbar x_1 y_1 \gamma_{21} +$$

$$e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{12}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_1 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar^2 t_1 x_1 y_1 \gamma_{12} \gamma_{21} +$$

$$e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{12}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_1 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar^2 t_1 x_3 y_1 \gamma_{13} \gamma_{21} +$$

$$e^{\gamma \hbar t_1 \lambda_{12}+\gamma \hbar t_1 \lambda_{22}+\gamma \hbar t_3 \lambda_{32}} \hbar x_1 y_1 \gamma_{22} - e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{12}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_1 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}}$$

$$\hbar^2 t_1 x_1 y_1 \gamma_{11} \gamma_{22} + e^{\gamma \hbar t_1 \lambda_{12}+\gamma \hbar t_1 \lambda_{22}+\gamma \hbar t_3 \lambda_{32}} \hbar x_3 y_1 \gamma_{23} -$$

$$e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{12}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_1 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar^2 t_1 x_3 y_1 \gamma_{11} \gamma_{23} + e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}}$$

$$\hbar x_1 y_3 \gamma_{31} - e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{12}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_1 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar^2 t_1 x_1 y_3 \gamma_{22} \gamma_{31} -$$

$$e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{12}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_1 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar^2 t_1 x_3 y_3 \gamma_{23} \gamma_{31} +$$

$$e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{12}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_1 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar x_1 y_3 \gamma_{32} +$$

$$e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{12}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_1 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar^2 t_1 x_1 y_3 \gamma_{21} \gamma_{32} +$$

$$e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{12}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_1 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar x_3 y_3 \gamma_{33} +$$

$$e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{12}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_1 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar^2 t_1 x_3 y_3 \gamma_{21} \gamma_{33} +$$

$$e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{12}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_1 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar a_1 t_1 \lambda_{11} +$$

$$e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{12}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_1 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar^2 a_1 t_1^2 \gamma_{21} \lambda_{11} +$$

$$e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{12}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_1 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar a_1 t_1 \lambda_{12} +$$

$$e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{12}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_1 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar^2 a_1 t_1^2 \gamma_{21} \lambda_{12} +$$

$$e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{12}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_1 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar a_3 t_1 \lambda_{13} +$$

$$e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{12}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_1 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar^2 a_3 t_1^2 \gamma_{21} \lambda_{13} +$$

$$e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{12}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_1 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar a_1 t_1 \lambda_{21} +$$

$$e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{12}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_1 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar^2 a_1 t_1^2 \gamma_{21} \lambda_{21} +$$

$$e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{12}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_1 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar a_1 t_1 \lambda_{22} +$$

$$e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{12}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_1 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar^2 a_1 t_1^2 \gamma_{21} \lambda_{22} +$$

$$e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{12}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_1 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar a_3 t_1 \lambda_{23} +$$

$$e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{12}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_1 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar^2 a_3 t_1^2 \gamma_{21} \lambda_{23} +$$

$$e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{12}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_1 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar a_1 t_3 \lambda_{31} +$$
$$e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{12}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_1 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar^2 a_1 t_1 t_3 \gamma_{21} \lambda_{31} +$$
$$e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{12}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_1 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar a_1 t_3 \lambda_{32} +$$
$$e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{12}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_1 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar^2 a_1 t_1 t_3 \gamma_{21} \lambda_{32} +$$
$$e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{12}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_1 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar a_3 t_3 \lambda_{33} +$$
$$e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{12}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_1 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar^2 a_3 t_1 t_3 \gamma_{21} \lambda_{33}\Big), \frac{1}{1+\hbar t_1 \gamma_{21}} + \frac{1}{2\left(1+\hbar t_1 \gamma_{21}\right)}$$

$$e^{-\frac{\gamma \left(\hbar t_1 \lambda_{11}+\hbar^2 t_1^2 \gamma_{21} \lambda_{11}+\hbar t_1 \lambda_{21}+\hbar^2 t_1^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_1 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_1 \gamma_{21}} - \frac{e^{-\gamma \hbar t_1 \lambda_{11}-\gamma \hbar t_1 \lambda_{21}-\gamma \hbar t_3 \lambda_{31}} \gamma \left(e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_1 \lambda_{12}+e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_1^2 \gamma_{21} \lambda_{12}+e^{\gamma \hbar t_1 \lambda_{11}+}\right.}{}}$$

$$\Big(4$$

$$e^{\frac{\gamma \left(\hbar t_1 \lambda_{11}+\hbar^2 t_1^2 \gamma_{21} \lambda_{11}+\hbar t_1 \lambda_{21}+\hbar^2 t_1^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_1 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_1 \gamma_{21}} + \frac{e^{-\gamma \hbar t_1 \lambda_{11}-\gamma \hbar t_1 \lambda_{21}-\gamma \hbar t_3 \lambda_{31}} \gamma \left(e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_1 \lambda_{12}+e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_1^2 \gamma_{21} \lambda_{12}+e^{\gamma}\right.}{}}$$
$$\hbar^2 a_1 x_1 y_1 \gamma_{11} \gamma_{22} - 2 e^{\frac{\gamma \left(\hbar t_1 \lambda_{11}+\hbar^2 t_1^2 \gamma_{21} \lambda_{11}+\hbar t_1 \lambda_{21}+\hbar^2 t_1^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_1 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_1 \gamma_{21}} \gamma \hbar^3 x_1^2 y_1^2 \gamma_{11}^2 \gamma_{22} - 2$$
$$e^{\frac{e^{-\gamma \hbar t_1 \lambda_{11}-\gamma \hbar t_1 \lambda_{21}-\gamma \hbar t_3 \lambda_{31}} \gamma \left(e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_1 \lambda_{12}+e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_1^2 \gamma_{21} \lambda_{12}+e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_1 \lambda_{22}+e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_1^2 \gamma_{21} \lambda_{22}+\right.}{1+\hbar t_1 \gamma_{21}}}$$
$$\gamma \hbar^3 x_1^2 y_1^2 \gamma_{11} \gamma_{22}^2 +$$
$$e^{\frac{\gamma \left(\hbar t_1 \lambda_{11}+\hbar^2 t_1^2 \gamma_{21} \lambda_{11}+\hbar t_1 \lambda_{21}+\hbar^2 t_1^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_1 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_1 \gamma_{21}} + \frac{e^{-\gamma \hbar t_1 \lambda_{11}-\gamma \hbar t_1 \lambda_{21}-\gamma \hbar t_3 \lambda_{31}} \gamma \left(e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_1 \lambda_{12}+e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_1^2 \gamma_{21} \lambda_{12}+e^{\gamma \hbar t}\right.}{}}$$
$$\gamma \hbar^4 t_1 x_1^2 y_1^2 \gamma_{11}^2 \gamma_{22}^2 + 4$$
$$e^{\frac{\gamma \left(\hbar t_1 \lambda_{11}+\hbar^2 t_1^2 \gamma_{21} \lambda_{11}+\hbar t_1 \lambda_{21}+\hbar^2 t_1^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_1 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_1 \gamma_{21}} + \frac{e^{-\gamma \hbar t_1 \lambda_{11}-\gamma \hbar t_1 \lambda_{21}-\gamma \hbar t_3 \lambda_{31}} \gamma \left(e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_1 \lambda_{12}+e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_1^2 \gamma_{21} \lambda_{12}+e^{\gamma}\right.}{}}$$
$$\hbar^2 a_1 x_3 y_1 \gamma_{11} \gamma_{23} - 2 e^{\frac{\gamma \left(\hbar t_1 \lambda_{11}+\hbar^2 t_1^2 \gamma_{21} \lambda_{11}+\hbar t_1 \lambda_{21}+\hbar^2 t_1^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_1 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_1 \gamma_{21}} \gamma \hbar^3 x_1 x_3 y_1^2 \gamma_{11}^2 \gamma_{23} - 4$$
$$e^{\frac{e^{-\gamma \hbar t_1 \lambda_{11}-\gamma \hbar t_1 \lambda_{21}-\gamma \hbar t_3 \lambda_{31}} \gamma \left(e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_1 \lambda_{12}+e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_1^2 \gamma_{21} \lambda_{12}+e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_1 \lambda_{22}+e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_1^2 \gamma_{21} \lambda_{22}+\right.}{1+\hbar t_1 \gamma_{21}}}$$
$$\gamma \hbar^3 x_1 x_3 y_1^2 \gamma_{11} \gamma_{22} \gamma_{23} + 2$$
$$e^{\frac{\gamma \left(\hbar t_1 \lambda_{11}+\hbar^2 t_1^2 \gamma_{21} \lambda_{11}+\hbar t_1 \lambda_{21}+\hbar^2 t_1^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_1 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_1 \gamma_{21}} + \frac{e^{-\gamma \hbar t_1 \lambda_{11}-\gamma \hbar t_1 \lambda_{21}-\gamma \hbar t_3 \lambda_{31}} \gamma \left(e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_1 \lambda_{12}+e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_1^2 \gamma_{21} \lambda_{12}+e^{\gamma}\right.}{}}$$
$$\gamma \hbar^4 t_1 x_1 x_3 y_1^2 \gamma_{11}^2 \gamma_{22} \gamma_{23} - 2$$
$$e^{\frac{e^{-\gamma \hbar t_1 \lambda_{11}-\gamma \hbar t_1 \lambda_{21}-\gamma \hbar t_3 \lambda_{31}} \gamma \left(e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_1 \lambda_{12}+e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_1^2 \gamma_{21} \lambda_{12}+e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_1 \lambda_{22}+e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_1^2 \gamma_{21} \lambda_{22}+\right.}{1+\hbar t_1 \gamma_{21}}}$$
$$\gamma \hbar^3 x_3^2 y_1^2 \gamma_{11} \gamma_{23}^2 +$$
$$e^{\frac{\gamma \left(\hbar t_1 \lambda_{11}+\hbar^2 t_1^2 \gamma_{21} \lambda_{11}+\hbar t_1 \lambda_{21}+\hbar^2 t_1^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_1 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_1 \gamma_{21}} + \frac{e^{-\gamma \hbar t_1 \lambda_{11}-\gamma \hbar t_1 \lambda_{21}-\gamma \hbar t_3 \lambda_{31}} \gamma \left(e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_1 \lambda_{12}+e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_1^2 \gamma_{21} \lambda_{12}+e^{\gamma \hbar t}\right.}{}}$$
$$\gamma \hbar^4 t_1 x_3^2 y_1^2 \gamma_{11}^2 \gamma_{23}^2 + 4$$
$$e^{\frac{\gamma \left(\hbar t_1 \lambda_{11}+\hbar^2 t_1^2 \gamma_{21} \lambda_{11}+\hbar t_1 \lambda_{21}+\hbar^2 t_1^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_1 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_1 \gamma_{21}} + \frac{e^{-\gamma \hbar t_1 \lambda_{11}-\gamma \hbar t_1 \lambda_{21}-\gamma \hbar t_3 \lambda_{31}} \gamma \left(e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_1 \lambda_{12}+e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_1^2 \gamma_{21} \lambda_{12}+e^{\gamma}\right.}{}}$$
$$\hbar^2 a_1 x_1 y_3 \gamma_{22} \gamma_{31} - 4 e^{\frac{\gamma \left(\hbar t_1 \lambda_{11}+\hbar^2 t_1^2 \gamma_{21} \lambda_{11}+\hbar t_1 \lambda_{21}+\hbar^2 t_1^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_1 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_1 \gamma_{21}}}$$
$$\gamma \hbar^3 x_1^2 y_1 y_3 \gamma_{11} \gamma_{22} \gamma_{31} - 2$$
$$e^{\frac{e^{-\gamma \hbar t_1 \lambda_{11}-\gamma \hbar t_1 \lambda_{21}-\gamma \hbar t_3 \lambda_{31}} \gamma \left(e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_1 \lambda_{12}+e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_1^2 \gamma_{21} \lambda_{12}+e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_1 \lambda_{22}+e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_1^2 \gamma_{21} \lambda_{22}+\right.}{1+\hbar t_1 \gamma_{21}}}$$
$$\gamma \hbar^3 x_1^2 y_1 y_3 \gamma_{22}^2 \gamma_{31} + 2$$
$$e^{\frac{\gamma \left(\hbar t_1 \lambda_{11}+\hbar^2 t_1^2 \gamma_{21} \lambda_{11}+\hbar t_1 \lambda_{21}+\hbar^2 t_1^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_1 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_1 \gamma_{21}} + \frac{e^{-\gamma \hbar t_1 \lambda_{11}-\gamma \hbar t_1 \lambda_{21}-\gamma \hbar t_3 \lambda_{31}} \gamma \left(e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_1 \lambda_{12}+e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_1^2 \gamma_{21} \lambda_{12}+e^{\gamma}\right.}{}}$$
$$\gamma \hbar^4 t_1 x_1^2 y_1 y_3 \gamma_{11} \gamma_{22}^2 \gamma_{31} + 4$$
$$e^{\frac{\gamma \left(\hbar t_1 \lambda_{11}+\hbar^2 t_1^2 \gamma_{21} \lambda_{11}+\hbar t_1 \lambda_{21}+\hbar^2 t_1^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_1 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_1 \gamma_{21}} + \frac{e^{-\gamma \hbar t_1 \lambda_{11}-\gamma \hbar t_1 \lambda_{21}-\gamma \hbar t_3 \lambda_{31}} \gamma \left(e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_1 \lambda_{12}+e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_1^2 \gamma_{21} \lambda_{12}+e^{\gamma}\right.}{}}$$
$$\hbar^2 a_1 x_3 y_3 \gamma_{23} \gamma_{31} - 4 e^{\frac{\gamma \left(\hbar t_1 \lambda_{11}+\hbar^2 t_1^2 \gamma_{21} \lambda_{11}+\hbar t_1 \lambda_{21}+\hbar^2 t_1^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_1 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_1 \gamma_{21}}}$$
$$\gamma \hbar^3 x_1 x_3 y_1 y_3 \gamma_{11} \gamma_{23} \gamma_{31} - 4$$
$$e^{\frac{e^{-\gamma \hbar t_1 \lambda_{11}-\gamma \hbar t_1 \lambda_{21}-\gamma \hbar t_3 \lambda_{31}} \gamma \left(e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_1 \lambda_{12}+e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_1^2 \gamma_{21} \lambda_{12}+e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_1 \lambda_{22}+e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_1^2 \gamma_{21} \lambda_{22}+\right.}{1+\hbar t_1 \gamma_{21}}}$$
$$\gamma \hbar^3 x_1 x_3 y_1 y_3 \gamma_{22} \gamma_{23} \gamma_{31} + 4$$
$$e^{\frac{\gamma \left(\hbar t_1 \lambda_{11}+\hbar^2 t_1^2 \gamma_{21} \lambda_{11}+\hbar t_1 \lambda_{21}+\hbar^2 t_1^2 \gamma_{21} \lambda_{21}+\hbar t_3 \lambda_{31}+\hbar^2 t_1 t_3 \gamma_{21} \lambda_{31}\right)}{1+\hbar t_1 \gamma_{21}} + \frac{e^{-\gamma \hbar t_1 \lambda_{11}-\gamma \hbar t_1 \lambda_{21}-\gamma \hbar t_3 \lambda_{31}} \gamma \left(e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar t_1 \lambda_{12}+e^{\gamma \hbar t_1 \lambda_{11}+\gamma \hbar t_1 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_1^2 \gamma_{21} \lambda_{12}+e^{\gamma}\right.}{}}$$
$$\gamma \hbar^4 t_1 x_1 x_3 y_1 y_3 \gamma_{11} \gamma_{22} \gamma_{23} \gamma_{31} - 2$$

$$e^{\frac{e^{-\gamma\hbar t_1\lambda_{11}-\gamma\hbar t_1\lambda_{21}-\gamma\hbar t_3\lambda_{31}}\gamma\left(e^{\gamma\hbar t_1\lambda_{11}+\gamma\hbar t_1\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar t_1\lambda_{12}+e^{\gamma\hbar t_1\lambda_{11}+\gamma\hbar t_1\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar^2 t_1^2\gamma_{21}\lambda_{12}+e^{\gamma\hbar t_1\lambda_{11}+\gamma\hbar t_1\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar t_1\lambda_{22}+e^{\gamma\hbar t_1\lambda_{11}+\gamma\hbar t_1\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar^2 t_1^2\gamma_{21}\lambda_{22}+\cdots\right.}{1+\hbar t_1\gamma_{21}}}$$

$$\gamma\hbar^3 x_3^2 y_1 y_3 \gamma_{23}^2\gamma_{31} + 2\, e^{\frac{\gamma\left(\hbar t_1\lambda_{11}+\hbar^2 t_1^2\gamma_{21}\lambda_{11}+\hbar t_1\lambda_{21}+\hbar^2 t_1^2\gamma_{21}\lambda_{21}+\hbar t_3\lambda_{31}+\hbar^2 t_1 t_3\gamma_{21}\lambda_{31}\right)}{1+\hbar t_1\gamma_{21}}}\frac{e^{-\gamma\hbar t_1\lambda_{11}-\gamma\hbar t_1\lambda_{21}-\gamma\hbar t_3\lambda_{31}}\gamma\left(e^{\gamma\hbar t_1\lambda_{11}+\gamma\hbar t_1\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar t_1\lambda_{12}+e^{\gamma\hbar t_1\lambda_{11}+\gamma\hbar t_1\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar^2 t_1^2\gamma_{21}\lambda_{12}+e^{\cdots}\right.}{\cdots}$$

$$\gamma\hbar^4 t_1 x_3^2 y_1 y_3 \gamma_{11}\gamma_{23}^2\gamma_{31} - 2\, e^{\frac{\gamma\left(\hbar t_1\lambda_{11}+\hbar^2 t_1^2\gamma_{21}\lambda_{11}+\hbar t_1\lambda_{21}+\hbar^2 t_1^2\gamma_{21}\lambda_{21}+\hbar t_3\lambda_{31}+\hbar^2 t_1 t_3\gamma_{21}\lambda_{31}\right)}{1+\hbar t_1\gamma_{21}}}$$

$$\gamma\hbar^3 x_1^2 y_3^2 \gamma_{22}\gamma_{31}^2 +$$

$$e^{\frac{\gamma\left(\hbar t_1\lambda_{11}+\hbar^2 t_1^2\gamma_{21}\lambda_{11}+\hbar t_1\lambda_{21}+\hbar^2 t_1^2\gamma_{21}\lambda_{21}+\hbar t_3\lambda_{31}+\hbar^2 t_1 t_3\gamma_{21}\lambda_{31}\right)}{1+\hbar t_1\gamma_{21}}}\frac{e^{-\gamma\hbar t_1\lambda_{11}-\gamma\hbar t_1\lambda_{21}-\gamma\hbar t_3\lambda_{31}}\gamma\left(e^{\gamma\hbar t_1\lambda_{11}+\gamma\hbar t_1\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar t_1\lambda_{12}+e^{\gamma\hbar t_1\lambda_{11}+\gamma\hbar t_1\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar^2 t_1^2\gamma_{21}\lambda_{12}+e^{\cdots}\right.}{\cdots}$$

$$\gamma\hbar^4 t_1 x_1^2 y_3^2 \gamma_{22}^2\gamma_{31}^2 - 2\, e^{\frac{\gamma\left(\hbar t_1\lambda_{11}+\hbar^2 t_1^2\gamma_{21}\lambda_{11}+\hbar t_1\lambda_{21}+\hbar^2 t_1^2\gamma_{21}\lambda_{21}+\hbar t_3\lambda_{31}+\hbar^2 t_1 t_3\gamma_{21}\lambda_{31}\right)}{1+\hbar t_1\gamma_{21}}}\gamma\hbar^3 x_1 x_3 y_3^2 \gamma_{23}\gamma_{31}^2 + 2$$

$$e^{\frac{\gamma\left(\hbar t_1\lambda_{11}+\hbar^2 t_1^2\gamma_{21}\lambda_{11}+\hbar t_1\lambda_{21}+\hbar^2 t_1^2\gamma_{21}\lambda_{21}+\hbar t_3\lambda_{31}+\hbar^2 t_1 t_3\gamma_{21}\lambda_{31}\right)}{1+\hbar t_1\gamma_{21}}}\frac{e^{-\gamma\hbar t_1\lambda_{11}-\gamma\hbar t_1\lambda_{21}-\gamma\hbar t_3\lambda_{31}}\gamma\left(e^{\gamma\hbar t_1\lambda_{11}+\gamma\hbar t_1\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar t_1\lambda_{12}+e^{\gamma\hbar t_1\lambda_{11}+\gamma\hbar t_1\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar^2 t_1^2\gamma_{21}\lambda_{12}+e^{\cdots}\right.}{\cdots}$$

$$\gamma\hbar^4 t_1 x_1 x_3 y_3^2 \gamma_{22}\gamma_{23}\gamma_{31}^2 +$$

$$e^{\frac{\gamma\left(\hbar t_1\lambda_{11}+\hbar^2 t_1^2\gamma_{21}\lambda_{11}+\hbar t_1\lambda_{21}+\hbar^2 t_1^2\gamma_{21}\lambda_{21}+\hbar t_3\lambda_{31}+\hbar^2 t_1 t_3\gamma_{21}\lambda_{31}\right)}{1+\hbar t_1\gamma_{21}}}\frac{e^{-\gamma\hbar t_1\lambda_{11}-\gamma\hbar t_1\lambda_{21}-\gamma\hbar t_3\lambda_{31}}\gamma\left(e^{\gamma\hbar t_1\lambda_{11}+\gamma\hbar t_1\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar t_1\lambda_{12}+e^{\gamma\hbar t_1\lambda_{11}+\gamma\hbar t_1\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\hbar^2 t_1^2\gamma_{21}\lambda_{12}+e^{\cdots}\right.}{\cdots}$$

$$\left.\gamma\hbar^4 t_1 x_3^2 y_3^2 \gamma_{23}^2\gamma_{31}^2\right)\epsilon + O[\epsilon]^2\Big]$$

$$-\frac{\gamma\hbar t_2\lambda_{11}}{1+\hbar t_2\gamma_{21}} - \frac{\gamma\hbar^2 t_2^2\gamma_{21}\lambda_{11}}{1+\hbar t_2\gamma_{21}} - \frac{\gamma\hbar t_2\lambda_{21}}{1+\hbar t_2\gamma_{21}} - \frac{\gamma\hbar^2 t_2^2\gamma_{21}\lambda_{21}}{1+\hbar t_2\gamma_{21}} - \frac{\gamma\hbar t_3\lambda_{31}}{1+\hbar t_2\gamma_{21}} - \frac{\gamma\hbar^2 t_2 t_3\gamma_{21}\lambda_{31}}{1+\hbar t_2\gamma_{21}}$$ // Together // Expand

$$-\gamma\hbar t_2\lambda_{11} - \gamma\hbar t_2\lambda_{21} - \gamma\hbar t_3\lambda_{31}$$

```
co = CCU[{y1, a1, x1}1, {y2, a2, x2}2,
   {y3, a3, x3}3, ℏ Sum[λ10 i+j ti aj + γ10 i+j yi xj, {i, 3}, {j, 3}], 11];
Timing@HL[(lhs = co // m1,2→1 // m1,3→1) == (rhs = co // m2,3→2 // m1,2→1)]
```

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$$\mathbb{C}_{CU}\Big[\{y_3, a_3, x_3\}_3, \{y_1, a_1, y_{\$19}, a_{\$19}, x_{\$19}, a_2, x_2\}_2,$$

$$\frac{1}{1+\hbar t_2\gamma_{21}}\Big(\hbar x_{\$19} y_1\gamma_{11} + \hbar x_2 y_1\gamma_{12} + \hbar x_3 y_1\gamma_{13} + \hbar x_{\$19} y_{\$19}\gamma_{21} + \hbar^2 t_2 x_2 y_1\gamma_{12}\gamma_{21} + \hbar^2 t_2 x_3 y_1\gamma_{13}\gamma_{21} +$$
$$\hbar x_2 y_{\$19}\gamma_{22} - \hbar^2 t_2 x_2 y_1\gamma_{11}\gamma_{22} + \hbar x_3 y_{\$19}\gamma_{23} - \hbar^2 t_2 x_3 y_1\gamma_{11}\gamma_{23} + \hbar x_{\$19} y_3\gamma_{31} - \hbar^2 t_2 x_2 y_3\gamma_{22}\gamma_{31} -$$
$$\hbar^2 t_2 x_3 y_3\gamma_{23}\gamma_{31} + \hbar x_2 y_3\gamma_{32} + \hbar^2 t_2 x_2 y_3\gamma_{21}\gamma_{32} + \hbar x_3 y_3\gamma_{33} + \hbar^2 t_2 x_3 y_3\gamma_{21}\gamma_{33} + \hbar a_1 t_2\lambda_{11} +$$
$$\hbar^2 a_1 t_2^2\gamma_{21}\lambda_{11} + \hbar a_2 t_2\lambda_{12} + \hbar^2 a_2 t_2^2\gamma_{21}\lambda_{12} + \hbar a_3 t_2\lambda_{13} + \hbar^2 a_3 t_2^2\gamma_{21}\lambda_{13} + \hbar a_1 t_2\lambda_{21} +$$
$$\hbar^2 a_1 t_2^2\gamma_{21}\lambda_{21} + \hbar a_2 t_2\lambda_{22} + \hbar^2 a_2 t_2^2\gamma_{21}\lambda_{22} + \hbar a_3 t_2\lambda_{23} + \hbar^2 a_3 t_2^2\gamma_{21}\lambda_{23} + \hbar a_1 t_3\lambda_{31} +$$
$$\hbar^2 a_1 t_2 t_3\gamma_{21}\lambda_{31} + \hbar a_2 t_3\lambda_{32} + \hbar^2 a_2 t_2 t_3\gamma_{21}\lambda_{32} + \hbar a_3 t_3\lambda_{33} + \hbar^2 a_3 t_2 t_3\gamma_{21}\lambda_{33}\Big),$$

$$\frac{1}{1+\hbar t_2\gamma_{21}} + \frac{1}{2(1+\hbar t_2\gamma_{21})}\Big(4\hbar^2 a_{\$19} x_2 y_1\gamma_{11}\gamma_{22} - 2\gamma\hbar^3 x_2 x_{\$19} y_1^2\gamma_{11}^2\gamma_{22} - 2\gamma\hbar^3 x_2^2 y_1 y_{\$19}\gamma_{11}\gamma_{22}^2 +$$
$$\gamma\hbar^4 t_2 x_2^2 y_1^2\gamma_{11}^2\gamma_{22}^2 + 4\hbar^2 a_{\$19} x_3 y_1\gamma_{11}\gamma_{23} - 2\gamma\hbar^3 x_3 x_{\$19} y_1^2\gamma_{11}^2\gamma_{23} - 4\gamma\hbar^3 x_2 x_3 y_1 y_{\$19}\gamma_{11}\gamma_{22}\gamma_{23} +$$
$$2\gamma\hbar^4 t_2 x_2 x_3 y_1^2\gamma_{11}^2\gamma_{22}\gamma_{23} - 2\gamma\hbar^3 x_3^2 y_1 y_{\$19}\gamma_{11}\gamma_{23}^2 + \gamma\hbar^4 t_2 x_3^2 y_1^2\gamma_{11}^2\gamma_{23}^2 + 4\hbar^2 a_{\$19} x_2 y_3\gamma_{22}\gamma_{31} -$$
$$4\gamma\hbar^3 x_2 x_{\$19} y_1 y_3\gamma_{11}\gamma_{22}\gamma_{31} - 2\gamma\hbar^3 x_2^2 y_3 y_{\$19}\gamma_{22}^2\gamma_{31} + 2\gamma\hbar^4 t_2 x_2^2 y_1 y_3\gamma_{11}\gamma_{22}^2\gamma_{31} + 4\hbar^2 a_{\$19} x_3 y_3\gamma_{23}$$
$$\gamma_{31} - 4\gamma\hbar^3 x_3 x_{\$19} y_1 y_3\gamma_{11}\gamma_{23}\gamma_{31} - 4\gamma\hbar^3 x_2 x_3 y_3 y_{\$19}\gamma_{22}\gamma_{23}\gamma_{31} + 4\gamma\hbar^4 t_2 x_2 x_3 y_1 y_3\gamma_{11}\gamma_{22}\gamma_{23}\gamma_{31} -$$
$$2\gamma\hbar^3 x_3^2 y_3 y_{\$19}\gamma_{23}^2\gamma_{31} + 2\gamma\hbar^4 t_2 x_3^2 y_1 y_3\gamma_{11}\gamma_{23}^2\gamma_{31} - 2\gamma\hbar^3 x_2 x_{\$19} y_3^2\gamma_{22}\gamma_{31}^2 + \gamma\hbar^4 t_2 x_2^2 y_3^2\gamma_{22}^2\gamma_{31}^2 -$$
$$2\gamma\hbar^3 x_3 x_{\$19} y_3^2\gamma_{23}\gamma_{31}^2 + 2\gamma\hbar^4 t_2 x_2 x_3 y_3^2\gamma_{22}\gamma_{23}\gamma_{31}^2 + \gamma\hbar^4 t_2 x_3^2 y_3^2\gamma_{23}^2\gamma_{31}^2\Big)\epsilon + O[\epsilon]^2\Big]$$

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$$\mathbb{E}_{CU}\Big[\{y_3, a_3, x_3\}_3, \{y_1, y_{\$20}, a_{\$20}, a_{\$19}, x_{\$19}, a_2, x_2\}_2,$$

$$\frac{1}{1+\hbar t_2 \gamma_{21}} e^{-\gamma \hbar t_2 \lambda_{11}-\gamma \hbar t_2 \lambda_{21}-\gamma \hbar t_3 \lambda_{31}} \Big(e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar x_{\$19} y_1 \gamma_{11} + e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar x_2 y_1 \gamma_{12} +$$
$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar x_3 y_1 \gamma_{13} + \hbar x_{\$19} y_{\$20} \gamma_{21} + e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2 x_2 y_1 \gamma_{12} \gamma_{21} +$$
$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2 x_3 y_1 \gamma_{13} \gamma_{21} + \hbar x_2 y_{\$20} \gamma_{22} - e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2 x_2 y_1 \gamma_{11} \gamma_{22} +$$
$$\hbar x_3 y_{\$20} \gamma_{23} - e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2 x_3 y_1 \gamma_{11} \gamma_{23} + e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar x_{\$19} y_3 \gamma_{31} -$$
$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2 x_2 y_3 \gamma_{22} \gamma_{31} - e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2 x_3 y_3 \gamma_{23} \gamma_{31} +$$
$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar x_2 y_3 \gamma_{32} + e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2 x_2 y_3 \gamma_{21} \gamma_{32} +$$
$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar x_3 y_3 \gamma_{33} + e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 t_2 x_3 y_3 \gamma_{21} \gamma_{33} +$$
$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar a_{\$20} t_2 \lambda_{11} + e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 a_{\$20} t_2^2 \gamma_{21} \lambda_{11} +$$
$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar a_2 t_2 \lambda_{12} + e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 a_2 t_2^2 \gamma_{21} \lambda_{12} +$$
$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar a_3 t_2 \lambda_{13} + e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 a_3 t_2^2 \gamma_{21} \lambda_{13} +$$
$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar a_{\$20} t_2 \lambda_{21} + e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 a_{\$20} t_2^2 \gamma_{21} \lambda_{21} +$$
$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar a_2 t_2 \lambda_{22} + e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 a_2 t_2^2 \gamma_{21} \lambda_{22} +$$
$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar a_3 t_2 \lambda_{23} + e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 a_3 t_2^2 \gamma_{21} \lambda_{23} +$$
$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar a_{\$20} t_3 \lambda_{31} + e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 a_{\$20} t_2 t_3 \gamma_{21} \lambda_{31} +$$
$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar a_2 t_3 \lambda_{32} + e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 a_2 t_2 t_3 \gamma_{21} \lambda_{32} +$$
$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar a_3 t_3 \lambda_{33} + e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 a_3 t_2 t_3 \gamma_{21} \lambda_{33}\Big),$$

$$\frac{1}{1+\hbar t_2 \gamma_{21}} + \frac{1}{2\,(1+\hbar t_2 \gamma_{21})} e^{-\gamma \hbar t_2 \lambda_{11}-\gamma \hbar t_2 \lambda_{21}-\gamma \hbar t_3 \lambda_{31}}$$
$$\Big(4\, e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 a_{\$19} x_2 y_1 \gamma_{11} \gamma_{22} - 2\, e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \gamma \hbar^3 x_2 x_{\$19} y_1^2 \gamma_{11}^2 \gamma_{22} -$$
$$2 \gamma \hbar^3 x_2^2 y_1 y_{\$20} \gamma_{11} \gamma_{22}^2 + e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \gamma \hbar^4 t_2 x_2^2 y_1^2 \gamma_{11}^2 \gamma_{22}^2 +$$
$$4\, e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 a_{\$19} x_3 y_1 \gamma_{11} \gamma_{23} - 2\, e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \gamma \hbar^3 x_3 x_{\$19} y_1^2 \gamma_{11}^2 \gamma_{23} -$$
$$4 \gamma \hbar^3 x_2 x_3 y_1 y_{\$20} \gamma_{11} \gamma_{22} \gamma_{23} + 2\, e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \gamma \hbar^4 t_2 x_2 x_3 y_1^2 \gamma_{11}^2 \gamma_{22} \gamma_{23} -$$
$$2 \gamma \hbar^3 x_3^2 y_1 y_{\$20} \gamma_{11} \gamma_{23}^2 + e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \gamma \hbar^4 t_2 x_3^2 y_1^2 \gamma_{11}^2 \gamma_{23}^2 +$$
$$4\, e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 a_{\$19} x_2 y_3 \gamma_{22} \gamma_{31} - 4\, e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \gamma \hbar^3 x_2 x_{\$19} y_1 y_3 \gamma_{11} \gamma_{22} \gamma_{31} -$$
$$2 \gamma \hbar^3 x_2^2 y_3 y_{\$20} \gamma_{22}^2 \gamma_{31} + 2\, e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \gamma \hbar^4 t_2 x_2^2 y_1 y_3 \gamma_{11} \gamma_{22}^2 \gamma_{31} +$$
$$4\, e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar^2 a_{\$19} x_3 y_3 \gamma_{23} \gamma_{31} - 4\, e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \gamma \hbar^3 x_3 x_{\$19} y_1 y_3 \gamma_{11} \gamma_{23} \gamma_{31} -$$
$$4 \gamma \hbar^3 x_2 x_3 y_3 y_{\$20} \gamma_{22} \gamma_{23} \gamma_{31} + 4\, e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \gamma \hbar^4 t_2 x_2 x_3 y_1 y_3 \gamma_{11} \gamma_{22} \gamma_{23} \gamma_{31} -$$
$$2 \gamma \hbar^3 x_3^2 y_3 y_{\$20} \gamma_{23}^2 \gamma_{31} + 2\, e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \gamma \hbar^4 t_2 x_3^2 y_1 y_3 \gamma_{11} \gamma_{23}^2 \gamma_{31} -$$
$$2\, e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \gamma \hbar^3 x_2 x_{\$19} y_3^2 \gamma_{22} \gamma_{31}^2 + e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \gamma \hbar^4 t_2 x_2^2 y_3^2 \gamma_{22}^2 \gamma_{31}^2 -$$
$$2\, e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \gamma \hbar^3 x_3 x_{\$19} y_3^2 \gamma_{23} \gamma_{31}^2 + 2\, e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \gamma \hbar^4 t_2 x_2 x_3 y_3^2 \gamma_{22} \gamma_{23} \gamma_{31}^2 +$$
$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \gamma \hbar^4 t_2 x_3^2 y_3^2 \gamma_{23}^2 \gamma_{31}^2\Big) \in + O[\in]^2\Big]$$

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\begin{aligned}
&\text{Œ}_{CU}\Big[\{y_3, a_3, x_3\}_3, \{y_{\$21}, a_{\$20}, a_{\$19}, x_{\$19}, a_2, x_2\}_2, \frac{1}{1+\hbar\, t_2\, \gamma_{21}} \\
&\quad e^{-\gamma\hbar t_2 \lambda_{11}-\gamma\hbar t_2 \lambda_{21}-\gamma\hbar t_3 \lambda_{31}} \Big(e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar\, x_{\$19}\, y_{\$21}\, \gamma_{11} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar\, x_2\, y_{\$21}\, \gamma_{12} + \\
&\qquad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar\, x_3\, y_{\$21}\, \gamma_{13} + \hbar\, x_{\$19}\, y_{\$21}\, \gamma_{21} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2\, t_2\, x_2\, y_{\$21}\, \gamma_{12}\, \gamma_{21} + \\
&\qquad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2\, t_2\, x_3\, y_{\$21}\, \gamma_{13}\, \gamma_{21} + \hbar\, x_2\, y_{\$21}\, \gamma_{22} - e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2\, t_2\, x_2\, y_{\$21}\, \gamma_{11}\, \gamma_{22} + \\
&\qquad \hbar\, x_3\, y_{\$21}\, \gamma_{23} - e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2\, t_2\, x_3\, y_{\$21}\, \gamma_{11}\, \gamma_{23} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar\, x_{\$19}\, y_3\, \gamma_{31} - \\
&\qquad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2\, t_2\, x_2\, y_3\, \gamma_{22}\, \gamma_{31} - e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2\, t_2\, x_3\, y_3\, \gamma_{23}\, \gamma_{31} + \\
&\qquad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar\, x_2\, y_3\, \gamma_{32} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2\, t_2\, x_2\, y_3\, \gamma_{21}\, \gamma_{32} + \\
&\qquad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar\, x_3\, y_3\, \gamma_{33} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2\, t_2\, x_3\, y_3\, \gamma_{21}\, \gamma_{33} + \\
&\qquad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar\, a_{\$20}\, t_2\, \lambda_{11} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2\, a_{\$20}\, t_2^2\, \gamma_{21}\, \lambda_{11} + \\
&\qquad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar\, a_2\, t_2\, \lambda_{12} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2\, a_2\, t_2^2\, \gamma_{21}\, \lambda_{12} + \\
&\qquad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar\, a_3\, t_2\, \lambda_{13} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2\, a_3\, t_2^2\, \gamma_{21}\, \lambda_{13} + \\
&\qquad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar\, a_{\$20}\, t_2\, \lambda_{21} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2\, a_{\$20}\, t_2^2\, \gamma_{21}\, \lambda_{21} + \\
&\qquad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar\, a_2\, t_2\, \lambda_{22} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2\, a_2\, t_2^2\, \gamma_{21}\, \lambda_{22} + \\
&\qquad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar\, a_3\, t_2\, \lambda_{23} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2\, a_3\, t_2^2\, \gamma_{21}\, \lambda_{23} + \\
&\qquad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar\, a_{\$20}\, t_3\, \lambda_{31} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2\, a_{\$20}\, t_2\, t_3\, \gamma_{21}\, \lambda_{31} + \\
&\qquad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar\, a_2\, t_3\, \lambda_{32} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2\, a_2\, t_2\, t_3\, \gamma_{21}\, \lambda_{32} + \\
&\qquad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar\, a_3\, t_3\, \lambda_{33} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2\, a_3\, t_2\, t_3\, \gamma_{21}\, \lambda_{33}\Big), \\
&\frac{1}{1+\hbar\, t_2\, \gamma_{21}} + \frac{1}{2\,(1+\hbar\, t_2\, \gamma_{21})}\, e^{-\gamma\hbar t_2 \lambda_{11}-\gamma\hbar t_2 \lambda_{21}-\gamma\hbar t_3 \lambda_{31}} \\
&\quad \Big(4\, e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2\, a_{\$19}\, x_2\, y_{\$21}\, \gamma_{11}\, \gamma_{22} - 2\, e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \gamma\hbar^3\, x_2\, x_{\$19}\, y_{\$21}^2\, \gamma_{11}^2\, \gamma_{22} - \\
&\qquad 2\gamma\hbar^3\, x_2^2\, y_{\$21}^2\, \gamma_{11}\, \gamma_{22}^2 + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \gamma\hbar^4\, t_2\, x_2^2\, y_{\$21}^2\, \gamma_{11}^2\, \gamma_{22}^2 + \\
&\qquad 4\, e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2\, a_{\$19}\, x_3\, y_{\$21}\, \gamma_{11}\, \gamma_{23} - 2\, e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \gamma\hbar^3\, x_3\, x_{\$19}\, y_{\$21}^2\, \gamma_{11}^2\, \gamma_{23} - \\
&\qquad 4\gamma\hbar^3\, x_2\, x_3\, y_{\$21}^2\, \gamma_{11}\, \gamma_{22}\, \gamma_{23} + 2\, e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \gamma\hbar^4\, t_2\, x_2\, x_3\, y_{\$21}^2\, \gamma_{11}^2\, \gamma_{22}\, \gamma_{23} - \\
&\qquad 2\gamma\hbar^3\, x_3^2\, y_{\$21}^2\, \gamma_{11}\, \gamma_{23}^2 + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \gamma\hbar^4\, t_2\, x_3^2\, y_{\$21}^2\, \gamma_{11}^2\, \gamma_{23}^2 + \\
&\qquad 4\, e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2\, a_{\$19}\, x_2\, y_3\, \gamma_{22}\, \gamma_{31} - 4\, e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \gamma\hbar^3\, x_2\, x_{\$19}\, y_3\, y_{\$21}\, \gamma_{11}\, \gamma_{22}\, \gamma_{31} - \\
&\qquad 2\gamma\hbar^3\, x_2^2\, y_3\, y_{\$21}\, \gamma_{22}^2\, \gamma_{31} + 2\, e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \gamma\hbar^4\, t_2\, x_2^2\, y_3\, y_{\$21}\, \gamma_{11}\, \gamma_{22}^2\, \gamma_{31} + \\
&\qquad 4\, e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2\, a_{\$19}\, x_3\, y_3\, \gamma_{23}\, \gamma_{31} - 4\, e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \gamma\hbar^3\, x_3\, x_{\$19}\, y_3\, y_{\$21}\, \gamma_{11}\, \gamma_{23}\, \gamma_{31} - \\
&\qquad 4\gamma\hbar^3\, x_2\, x_3\, y_3\, y_{\$21}\, \gamma_{22}\, \gamma_{23}\, \gamma_{31} + 4\, e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \gamma\hbar^4\, t_2\, x_2\, x_3\, y_3\, y_{\$21}\, \gamma_{11}\, \gamma_{22}\, \gamma_{23}\, \gamma_{31} - \\
&\qquad 2\gamma\hbar^3\, x_3^2\, y_3\, y_{\$21}\, \gamma_{23}^2\, \gamma_{31} + 2\, e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \gamma\hbar^4\, t_2\, x_3^2\, y_3\, y_{\$21}\, \gamma_{11}\, \gamma_{23}^2\, \gamma_{31} - \\
&\qquad 2\, e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \gamma\hbar^3\, x_2\, x_{\$19}\, y_3^2\, \gamma_{22}\, \gamma_{31}^2 + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \gamma\hbar^4\, t_2\, x_2^2\, y_3^2\, \gamma_{22}^2\, \gamma_{31}^2 - \\
&\qquad 2\, e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \gamma\hbar^3\, x_3\, x_{\$19}\, y_3^2\, \gamma_{23}\, \gamma_{31}^2 + 2\, e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \gamma\hbar^4\, t_2\, x_2\, x_3\, y_3^2\, \gamma_{22}\, \gamma_{23}\, \gamma_{31}^2 + \\
&\qquad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \gamma\hbar^4\, t_2\, x_3^2\, y_3^2\, \gamma_{23}^2\, \gamma_{31}^2\Big) \in + O[\in]^2\Big]
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\begin{aligned}
&\text{Œ}_{CU}\Big[\{y_3, a_3, x_3\}_3, \{y_{\$21}, a_{\$22}, x_{\$19}, a_2, x_2\}_2, \frac{1}{1+\hbar\, t_2\, \gamma_{21}}\\
&\quad e^{-\gamma\hbar t_2 \lambda_{11}-\gamma\hbar t_2 \lambda_{21}-\gamma\hbar t_3 \lambda_{31}} \Big(e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar\, x_{\$19}\, y_{\$21}\, \gamma_{11} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar\, x_2\, y_{\$21}\, \gamma_{12} +\\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar\, x_3\, y_{\$21}\, \gamma_{13} + \hbar\, x_{\$19}\, y_{\$21}\, \gamma_{21} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2\, t_2\, x_2\, y_{\$21}\, \gamma_{12}\, \gamma_{21} +\\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2\, t_2\, x_3\, y_{\$21}\, \gamma_{13}\, \gamma_{21} + \hbar\, x_2\, y_{\$21}\, \gamma_{22} - e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2\, t_2\, x_2\, y_{\$21}\, \gamma_{11}\, \gamma_{22} +\\
&\quad \hbar\, x_3\, y_{\$21}\, \gamma_{23} - e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2\, t_2\, x_3\, y_{\$21}\, \gamma_{11}\, \gamma_{23} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar\, x_{\$19}\, y_3\, \gamma_{31} -\\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2\, t_2\, x_2\, y_3\, \gamma_{22}\, \gamma_{31} - e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2\, t_2\, x_3\, y_3\, \gamma_{23}\, \gamma_{31} +\\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar\, x_2\, y_3\, \gamma_{32} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2\, t_2\, x_2\, y_3\, \gamma_{21}\, \gamma_{32} +\\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar\, x_3\, y_3\, \gamma_{33} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2\, t_2\, x_3\, y_3\, \gamma_{21}\, \gamma_{33} +\\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar\, a_{\$22}\, t_2\, \lambda_{11} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2\, a_{\$22}\, t_2^2\, \gamma_{21}\, \lambda_{11} +\\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar\, a_2\, t_2\, \lambda_{12} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2\, a_2\, t_2^2\, \gamma_{21}\, \lambda_{12} +\\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar\, a_3\, t_2\, \lambda_{13} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2\, a_3\, t_2^2\, \gamma_{21}\, \lambda_{13} +\\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar\, a_{\$22}\, t_2\, \lambda_{21} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2\, a_{\$22}\, t_2^2\, \gamma_{21}\, \lambda_{21} +\\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar\, a_2\, t_2\, \lambda_{22} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2\, a_2\, t_2^2\, \gamma_{21}\, \lambda_{22} +\\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar\, a_3\, t_2\, \lambda_{23} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2\, a_3\, t_2^2\, \gamma_{21}\, \lambda_{23} +\\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar\, a_{\$22}\, t_3\, \lambda_{31} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2\, a_{\$22}\, t_2\, t_3\, \gamma_{21}\, \lambda_{31} +\\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar\, a_2\, t_3\, \lambda_{32} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2\, a_2\, t_2\, t_3\, \gamma_{21}\, \lambda_{32} +\\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar\, a_3\, t_3\, \lambda_{33} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2\, a_3\, t_2\, t_3\, \gamma_{21}\, \lambda_{33}\Big),\\
&\frac{1}{1+\hbar\, t_2\, \gamma_{21}} + \frac{1}{2\,(1+\hbar\, t_2\, \gamma_{21})}\, e^{-\gamma\hbar t_2 \lambda_{11}-\gamma\hbar t_2 \lambda_{21}-\gamma\hbar t_3 \lambda_{31}}\\
&\quad \Big(4\, e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2\, a_{\$22}\, x_2\, y_{\$21}\, \gamma_{11}\, \gamma_{22} - 2\, e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \gamma\hbar^3\, x_2\, x_{\$19}\, y_{\$21}^2\, \gamma_{11}^2\, \gamma_{22} -\\
&\quad 2\,\gamma\hbar^3\, x_2^2\, y_{\$21}^2\, \gamma_{11}\, \gamma_{22}^2 + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \gamma\hbar^4\, t_2\, x_2^2\, y_{\$21}^2\, \gamma_{11}^2\, \gamma_{22}^2 +\\
&\quad 4\, e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2\, a_{\$22}\, x_3\, y_{\$21}\, \gamma_{11}\, \gamma_{23} - 2\, e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \gamma\hbar^3\, x_3\, x_{\$19}\, y_{\$21}^2\, \gamma_{11}^2\, \gamma_{23} -\\
&\quad 4\,\gamma\hbar^3\, x_2\, x_3\, y_{\$21}^2\, \gamma_{11}\, \gamma_{22}\, \gamma_{23} + 2\, e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \gamma\hbar^4\, t_2\, x_2\, x_3\, y_{\$21}^2\, \gamma_{11}^2\, \gamma_{22}\, \gamma_{23} -\\
&\quad 2\,\gamma\hbar^3\, x_3^2\, y_{\$21}^2\, \gamma_{11}\, \gamma_{23}^2 + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \gamma\hbar^4\, t_2\, x_3^2\, y_{\$21}^2\, \gamma_{11}^2\, \gamma_{23}^2 +\\
&\quad 4\, e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2\, a_{\$22}\, x_2\, y_3\, \gamma_{22}\, \gamma_{31} - 4\, e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \gamma\hbar^3\, x_2\, x_{\$19}\, y_3\, y_{\$21}\, \gamma_{11}\, \gamma_{22}\, \gamma_{31} -\\
&\quad 2\,\gamma\hbar^3\, x_2^2\, y_3\, y_{\$21}\, \gamma_{22}^2\, \gamma_{31} + 2\, e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \gamma\hbar^4\, t_2\, x_2^2\, y_3\, y_{\$21}\, \gamma_{11}\, \gamma_{22}^2\, \gamma_{31} +\\
&\quad 4\, e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar^2\, a_{\$22}\, x_3\, y_3\, \gamma_{23}\, \gamma_{31} - 4\, e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \gamma\hbar^3\, x_3\, x_{\$19}\, y_3\, y_{\$21}\, \gamma_{11}\, \gamma_{23}\, \gamma_{31} -\\
&\quad 4\,\gamma\hbar^3\, x_2\, x_3\, y_3\, y_{\$21}\, \gamma_{22}\, \gamma_{23}\, \gamma_{31} + 4\, e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \gamma\hbar^4\, t_2\, x_2\, x_3\, y_3\, y_{\$21}\, \gamma_{11}\, \gamma_{22}\, \gamma_{23}\, \gamma_{31} -\\
&\quad 2\,\gamma\hbar^3\, x_3^2\, y_3\, y_{\$21}\, \gamma_{23}^2\, \gamma_{31} + 2\, e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \gamma\hbar^4\, t_2\, x_3^2\, y_3\, y_{\$21}\, \gamma_{11}\, \gamma_{23}^2\, \gamma_{31} -\\
&\quad 2\, e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \gamma\hbar^3\, x_2\, x_{\$19}\, y_3^2\, \gamma_{22}\, \gamma_{31}^2 + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \gamma\hbar^4\, t_2\, x_2^2\, y_3^2\, \gamma_{22}^2\, \gamma_{31}^2 -\\
&\quad 2\, e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \gamma\hbar^3\, x_3\, x_{\$19}\, y_3^2\, \gamma_{23}\, \gamma_{31}^2 + 2\, e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \gamma\hbar^4\, t_2\, x_2\, x_3\, y_3^2\, \gamma_{22}\, \gamma_{23}\, \gamma_{31}^2 +\\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \gamma\hbar^4\, t_2\, x_3^2\, y_3^2\, \gamma_{23}^2\, \gamma_{31}^2\Big) \in + O[\in]^2\Big]
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\begin{aligned}
&\mathbb{E}_{CU}\Big[\{y_3, a_3, x_3\}_3, \{y_{\$21}, a_{\$22}, a_{\$23}, x_{\$23}, x_2\}_2,\\
&\frac{1}{1+\hbar t_2 \gamma_{21}} e^{-\gamma\hbar t_2 \lambda_{11}-\gamma\hbar t_2 \lambda_{12}-\gamma\hbar t_2 \lambda_{21}-\gamma\hbar t_2 \lambda_{22}-\gamma\hbar t_3 \lambda_{31}-\gamma\hbar t_3 \lambda_{32}} \Big(e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar x_{\$23} y_{\$21} \gamma_{11} +\\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \hbar x_2 y_{\$21} \gamma_{12} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}}\\
&\quad \hbar x_3 y_{\$21} \gamma_{13} + \hbar x_{\$23} y_{\$21} \gamma_{21} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \hbar^2 t_2 x_2 y_{\$21} \gamma_{12} \gamma_{21} +\\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \hbar^2 t_2 x_3 y_{\$21} \gamma_{13} \gamma_{21} + e^{\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{32}} \hbar x_2 y_{\$21} \gamma_{22} -\\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \hbar^2 t_2 x_2 y_{\$21} \gamma_{11} \gamma_{22} +\\
&\quad e^{\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{32}} \hbar x_3 y_{\$21} \gamma_{23} - e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \hbar^2 t_2 x_3 y_{\$21} \gamma_{11} \gamma_{23} +\\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar x_{\$23} y_3 \gamma_{31} - e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \hbar^2 t_2 x_2 y_3 \gamma_{22} \gamma_{31} -\\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \hbar^2 t_2 x_3 y_3 \gamma_{23} \gamma_{31} +\\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \hbar x_2 y_3 \gamma_{32} +\\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \hbar^2 t_2 x_2 y_3 \gamma_{21} \gamma_{32} +\\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \hbar x_3 y_3 \gamma_{33} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}}\\
&\quad \hbar^2 t_2 x_3 y_3 \gamma_{21} \gamma_{33} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \hbar a_{\$22} t_2 \lambda_{11} +\\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \hbar^2 a_{\$22} t_2^2 \gamma_{21} \lambda_{11} +\\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \hbar a_{\$23} t_2 \lambda_{12} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}}\\
&\quad \hbar^2 a_{\$23} t_2^2 \gamma_{21} \lambda_{12} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \hbar a_3 t_2 \lambda_{13} +\\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \hbar^2 a_3 t_2^2 \gamma_{21} \lambda_{13} +\\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \hbar a_{\$22} t_2 \lambda_{21} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}}\\
&\quad \hbar^2 a_{\$22} t_2^2 \gamma_{21} \lambda_{21} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \hbar a_{\$23} t_2 \lambda_{22} +\\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \hbar^2 a_{\$23} t_2^2 \gamma_{21} \lambda_{22} +\\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \hbar a_3 t_2 \lambda_{23} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}}\\
&\quad \hbar^2 a_3 t_2^2 \gamma_{21} \lambda_{23} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \hbar a_{\$22} t_3 \lambda_{31} +\\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \hbar^2 a_{\$22} t_2 t_3 \gamma_{21} \lambda_{31} +\\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \hbar a_{\$23} t_3 \lambda_{32} +\\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \hbar^2 a_{\$23} t_2 t_3 \gamma_{21} \lambda_{32} +\\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \hbar a_3 t_3 \lambda_{33} +\\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \hbar^2 a_3 t_2 t_3 \gamma_{21} \lambda_{33}\Big),\\
&\frac{1}{1+\hbar t_2 \gamma_{21}} + \frac{1}{2\,(1+\hbar t_2 \gamma_{21})} e^{-\gamma\hbar t_2 \lambda_{11}-\gamma\hbar t_2 \lambda_{12}-\gamma\hbar t_2 \lambda_{21}-\gamma\hbar t_2 \lambda_{22}-\gamma\hbar t_3 \lambda_{31}-\gamma\hbar t_3 \lambda_{32}}\\
&\quad \Big(4 e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \hbar^2 a_{\$22} x_2 y_{\$21} \gamma_{11} \gamma_{22} -\\
&\quad 2 e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \gamma \hbar^3 x_2 x_{\$23} y_{\$21}^2 \gamma_{11}^2 \gamma_{22} - 2 e^{\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{32}} \gamma \hbar^3 x_2^2 y_{\$21}^2 \gamma_{11} \gamma_{22}^2 +\\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \gamma \hbar^4 t_2 x_2^2 y_{\$21}^2 \gamma_{11}^2 \gamma_{22}^2 +\\
&\quad 4 e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \hbar^2 a_{\$22} x_3 y_{\$21} \gamma_{11} \gamma_{23} -\\
&\quad 2 e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \gamma \hbar^3 x_3 x_{\$23} y_{\$21}^2 \gamma_{11}^2 \gamma_{23} - 4 e^{\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{32}} \gamma \hbar^3 x_2 x_3 y_{\$21}^2 \gamma_{11} \gamma_{22} \gamma_{23} +\\
&\quad 2 e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \gamma \hbar^4 t_2 x_2 x_3 y_{\$21}^2 \gamma_{11}^2 \gamma_{22} \gamma_{23} -\\
&\quad 2 e^{\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{32}} \gamma \hbar^3 x_3^2 y_{\$21}^2 \gamma_{11} \gamma_{23}^2 + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}}\\
&\quad \gamma \hbar^4 t_2 x_3^2 y_{\$21}^2 \gamma_{11}^2 \gamma_{23}^2 + 4 e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \hbar^2 a_{\$22} x_2 y_3 \gamma_{22} \gamma_{31} -\\
&\quad 4 e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \gamma \hbar^3 x_2 x_{\$23} y_3 y_{\$21} \gamma_{11} \gamma_{22} \gamma_{31} - 2 e^{\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{32}} \gamma \hbar^3 x_2^2 y_3 y_{\$21} \gamma_{22}^2 \gamma_{31} +\\
&\quad 2 e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \gamma \hbar^4 t_2 x_2^2 y_3 y_{\$21} \gamma_{11} \gamma_{22}^2 \gamma_{31} +\\
&\quad 4 e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \hbar^2 a_{\$22} x_3 y_3 \gamma_{23} \gamma_{31} - 4 e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}}\\
&\quad \gamma \hbar^3 x_3 x_{\$23} y_3 y_{\$21} \gamma_{11} \gamma_{23} \gamma_{31} - 4 e^{\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{32}} \gamma \hbar^3 x_2 x_3 y_3 y_{\$21} \gamma_{22} \gamma_{23} \gamma_{31} +\\
&\quad 4 e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \gamma \hbar^4 t_2 x_2 x_3 y_3 y_{\$21} \gamma_{11} \gamma_{22} \gamma_{23} \gamma_{31} -\\
&\quad 2 e^{\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{32}} \gamma \hbar^3 x_3^2 y_3 y_{\$21} \gamma_{23}^2 \gamma_{31} + 2 e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}}\\
&\quad \gamma \hbar^4 t_2 x_3^2 y_3 y_{\$21} \gamma_{11} \gamma_{23}^2 \gamma_{31} - 2 e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \gamma \hbar^3 x_2 x_{\$23} y_3^2 \gamma_{22} \gamma_{31}^2 +\\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \gamma \hbar^4 t_2 x_2^2 y_3^2 \gamma_{22}^2 \gamma_{31}^2 - 2 e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \gamma\\
&\quad \hbar^3 x_3 x_{\$23} y_3^2 \gamma_{23} \gamma_{31}^2 + 2 e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \gamma \hbar^4 t_2 x_2 x_3 y_3^2 \gamma_{22} \gamma_{23} \gamma_{31}^2 +\\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \gamma \hbar^4 t_2 x_3^2 y_3^2 \gamma_{23}^2 \gamma_{31}^2\Big) \epsilon + O[\epsilon]^2\Big]
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\begin{aligned}
&\mathbb{E}_{CU}\Big[\{y_3, a_3, x_3\}_3, \{y_{\$21}, a_{\$24}, x_{\$23}, x_2\}_2,\\
&\frac{1}{1+\hbar t_2 \gamma_{21}} e^{-\gamma\hbar t_2 \lambda_{11}-\gamma\hbar t_2 \lambda_{12}-\gamma\hbar t_2 \lambda_{21}-\gamma\hbar t_2 \lambda_{22}-\gamma\hbar t_3 \lambda_{31}-\gamma\hbar t_3 \lambda_{32}} \Big(e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar x_{\$23} y_{\$21} \gamma_{11} +\\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \hbar x_2 y_{\$21} \gamma_{12} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}}\\
&\quad \hbar x_3 y_{\$21} \gamma_{13} + \hbar x_{\$23} y_{\$21} \gamma_{21} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \hbar^2 t_2 x_2 y_{\$21} \gamma_{12} \gamma_{21} +\\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \hbar^2 t_2 x_3 y_{\$21} \gamma_{13} \gamma_{21} + e^{\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{32}} \hbar x_2 y_{\$21} \gamma_{22} -\\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \hbar^2 t_2 x_2 y_{\$21} \gamma_{11} \gamma_{22} +\\
&\quad e^{\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{32}} \hbar x_3 y_{\$21} \gamma_{23} - e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \hbar^2 t_2 x_3 y_{\$21} \gamma_{11} \gamma_{23} +\\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \hbar x_{\$23} y_3 \gamma_{31} - e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \hbar^2 t_2 x_2 y_3 \gamma_{22} \gamma_{31} -\\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \hbar^2 t_2 x_3 y_3 \gamma_{23} \gamma_{31} +\\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \hbar x_2 y_3 \gamma_{32} +\\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \hbar^2 t_2 x_2 y_3 \gamma_{21} \gamma_{32} +\\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \hbar x_3 y_3 \gamma_{33} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}}\\
&\quad \hbar^2 t_2 x_3 y_3 \gamma_{21} \gamma_{33} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \hbar a_{\$24} t_2 \lambda_{11} +\\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \hbar^2 a_{\$24} t_2^2 \gamma_{21} \lambda_{11} +\\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \hbar a_{\$24} t_2 \lambda_{12} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}}\\
&\quad \hbar^2 a_{\$24} t_2^2 \gamma_{21} \lambda_{12} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \hbar a_3 t_2 \lambda_{13} +\\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \hbar^2 a_3 t_2^2 \gamma_{21} \lambda_{13} +\\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \hbar a_{\$24} t_2 \lambda_{21} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}}\\
&\quad \hbar^2 a_{\$24} t_2^2 \gamma_{21} \lambda_{21} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \hbar a_{\$24} t_2 \lambda_{22} +\\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \hbar^2 a_{\$24} t_2^2 \gamma_{21} \lambda_{22} +\\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \hbar a_3 t_2 \lambda_{23} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}}\\
&\quad \hbar^2 a_3 t_2^2 \gamma_{21} \lambda_{23} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \hbar a_{\$24} t_3 \lambda_{31} +\\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \hbar^2 a_{\$24} t_2 t_3 \gamma_{21} \lambda_{31} +\\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \hbar a_{\$24} t_3 \lambda_{32} +\\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \hbar^2 a_{\$24} t_2 t_3 \gamma_{21} \lambda_{32} +\\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \hbar a_3 t_3 \lambda_{33} +\\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \hbar^2 a_3 t_2 t_3 \gamma_{21} \lambda_{33}\Big),\\
&\frac{1}{1+\hbar t_2 \gamma_{21}} + \frac{1}{2\,(1+\hbar t_2 \gamma_{21})} e^{-\gamma\hbar t_2 \lambda_{11}-\gamma\hbar t_2 \lambda_{12}-\gamma\hbar t_2 \lambda_{21}-\gamma\hbar t_2 \lambda_{22}-\gamma\hbar t_3 \lambda_{31}-\gamma\hbar t_3 \lambda_{32}}\\
&\quad \Big(4 e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \hbar^2 a_{\$24} x_2 y_{\$21} \gamma_{11} \gamma_{22} -\\
&\quad 2 e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \gamma \hbar^3 x_2 x_{\$23} y_{\$21}^2 \gamma_{11}^2 \gamma_{22} - 2 e^{\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{32}} \gamma \hbar^3 x_2^2 y_{\$21}^2 \gamma_{11} \gamma_{22}^2 +\\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \gamma \hbar^4 t_2 x_2^2 y_{\$21}^2 \gamma_{11}^2 \gamma_{22}^2 +\\
&\quad 4 e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \hbar^2 a_{\$24} x_3 y_{\$21} \gamma_{11} \gamma_{23} -\\
&\quad 2 e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \gamma \hbar^3 x_3 x_{\$23} y_{\$21}^2 \gamma_{11}^2 \gamma_{23} - 4 e^{\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{32}} \gamma \hbar^3 x_2 x_3 y_{\$21}^2 \gamma_{11} \gamma_{22} \gamma_{23} +\\
&\quad 2 e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \gamma \hbar^4 t_2 x_2 x_3 y_{\$21}^2 \gamma_{11}^2 \gamma_{22} \gamma_{23} -\\
&\quad 2 e^{\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{32}} \gamma \hbar^3 x_3^2 y_{\$21}^2 \gamma_{11} \gamma_{23}^2 + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}}\\
&\quad \gamma \hbar^4 t_2 x_3^2 y_{\$21}^2 \gamma_{11}^2 \gamma_{23}^2 + 4 e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \hbar^2 a_{\$24} x_2 y_3 \gamma_{22} \gamma_{31} -\\
&\quad 4 e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \gamma \hbar^3 x_2 x_{\$23} y_3 y_{\$21} \gamma_{11} \gamma_{22} \gamma_{31} - 2 e^{\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{32}} \gamma \hbar^3 x_2^2 y_3 y_{\$21} \gamma_{22}^2 \gamma_{31} +\\
&\quad 2 e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \gamma \hbar^4 t_2 x_2^2 y_3 y_{\$21} \gamma_{11} \gamma_{22}^2 \gamma_{31} +\\
&\quad 4 e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \hbar^2 a_{\$24} x_3 y_3 \gamma_{23} \gamma_{31} - 4 e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}}\\
&\quad \gamma \hbar^3 x_3 x_{\$23} y_3 y_{\$21} \gamma_{11} \gamma_{23} \gamma_{31} - 4 e^{\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{32}} \gamma \hbar^3 x_2 x_3 y_3 y_{\$21} \gamma_{22} \gamma_{23} \gamma_{31} +\\
&\quad 4 e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \gamma \hbar^4 t_2 x_2 x_3 y_3 y_{\$21} \gamma_{11} \gamma_{22} \gamma_{23} \gamma_{31} -\\
&\quad 2 e^{\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{32}} \gamma \hbar^3 x_3^2 y_3 y_{\$21} \gamma_{23}^2 \gamma_{31} + 2 e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}}\\
&\quad \gamma \hbar^4 t_2 x_3^2 y_3 y_{\$21} \gamma_{11} \gamma_{23}^2 \gamma_{31} - 2 e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \gamma \hbar^3 x_2 x_{\$23} y_3^2 \gamma_{22} \gamma_{31}^2 +\\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \gamma \hbar^4 t_2 x_2^2 y_3^2 \gamma_{22}^2 \gamma_{31}^2 - 2 e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \gamma\\
&\quad \hbar^3 x_3 x_{\$23} y_3^2 \gamma_{23} \gamma_{31}^2 + 2 e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \gamma \hbar^4 t_2 x_2 x_3 y_3^2 \gamma_{22} \gamma_{23} \gamma_{31}^2 +\\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \gamma \hbar^4 t_2 x_3^2 y_3^2 \gamma_{23}^2 \gamma_{31}^2\Big) \epsilon + O[\epsilon]^2\Big]
\end{aligned}
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\begin{aligned}
&\text{Œ}_{CU}\Big[\{y_3, a_3, x_3\}_3, \{y_{\$21}, a_{\$24}, x_{\$25}\}_2, \frac{1}{1+\hbar\, t_2\, \gamma_{21}}\, e^{-\gamma\hbar t_2 \lambda_{11}-\gamma\hbar t_2 \lambda_{12}-\gamma\hbar t_2 \lambda_{21}-\gamma\hbar t_2 \lambda_{22}-\gamma\hbar t_3 \lambda_{31}-\gamma\hbar t_3 \lambda_{32}} \\
&\quad \Big(e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}}\, \hbar\, x_{\$25}\, y_{\$21}\, \gamma_{11} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}}\, \hbar\, x_{\$25}\, y_{\$21}\, \gamma_{12} + \\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}}\, \hbar\, x_3\, y_{\$21}\, \gamma_{13} + \hbar\, x_{\$25}\, y_{\$21}\, \gamma_{21} + \\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}}\, \hbar^2\, t_2\, x_{\$25}\, y_{\$21}\, \gamma_{12}\, \gamma_{21} + \\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}}\, \hbar^2\, t_2\, x_3\, y_{\$21}\, \gamma_{13}\, \gamma_{21} + e^{\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{32}}\, \hbar\, x_{\$25}\, y_{\$21}\, \gamma_{22} - \\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}}\, \hbar^2\, t_2\, x_{\$25}\, y_{\$21}\, \gamma_{11}\, \gamma_{22} + \\
&\quad e^{\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{32}}\, \hbar\, x_3\, y_{\$21}\, \gamma_{23} - e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}}\, \hbar^2\, t_2\, x_3\, y_{\$21}\, \gamma_{11}\, \gamma_{23} + \\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}}\, \hbar\, x_{\$25}\, y_3\, \gamma_{31} - e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}}\, \hbar^2\, t_2\, x_{\$25}\, y_3\, \gamma_{22}\, \gamma_{31} - \\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}}\, \hbar^2\, t_2\, x_3\, y_3\, \gamma_{23}\, \gamma_{31} + \\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}}\, \hbar\, x_{\$25}\, y_3\, \gamma_{32} + \\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}}\, \hbar^2\, t_2\, x_{\$25}\, y_3\, \gamma_{21}\, \gamma_{32} + \\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}}\, \hbar\, x_3\, y_3\, \gamma_{33} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \\
&\quad \hbar^2\, t_2\, x_3\, y_3\, \gamma_{21}\, \gamma_{33} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}}\, \hbar\, a_{\$24}\, t_2\, \lambda_{11} + \\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}}\, \hbar^2\, a_{\$24}\, t_2^2\, \gamma_{21}\, \lambda_{11} + \\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}}\, \hbar\, a_{\$24}\, t_2\, \lambda_{12} + \\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}}\, \hbar^2\, a_{\$24}\, t_2^2\, \gamma_{21}\, \lambda_{12} + \\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}}\, \hbar\, a_3\, t_2\, \lambda_{13} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \\
&\quad \hbar^2\, a_3\, t_2^2\, \gamma_{21}\, \lambda_{13} + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}}\, \hbar\, a_{\$24}\, t_2\, \lambda_{21} + \\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}}\, \hbar^2\, a_{\$24}\, t_2^2\, \gamma_{21}\, \lambda_{21} + \\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}}\, \hbar\, a_{\$24}\, t_2\, \lambda_{22} + \\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}}\, \hbar^2\, a_{\$24}\, t_2^2\, \gamma_{21}\, \lambda_{22} + \\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}}\, \hbar\, a_3\, t_2\, \lambda_{23} + \\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}}\, \hbar^2\, a_3\, t_2^2\, \gamma_{21}\, \lambda_{23} + \\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}}\, \hbar\, a_{\$24}\, t_3\, \lambda_{31} + \\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}}\, \hbar^2\, a_{\$24}\, t_2\, t_3\, \gamma_{21}\, \lambda_{31} + \\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}}\, \hbar\, a_{\$24}\, t_3\, \lambda_{32} + \\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}}\, \hbar^2\, a_{\$24}\, t_2\, t_3\, \gamma_{21}\, \lambda_{32} + \\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}}\, \hbar\, a_3\, t_3\, \lambda_{33} + \\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}}\, \hbar^2\, a_3\, t_2\, t_3\, \gamma_{21}\, \lambda_{33}\Big), \\
&\frac{1}{1+\hbar\, t_2\, \gamma_{21}} + \frac{1}{2\,(1+\hbar\, t_2\, \gamma_{21})}\, e^{-\gamma\hbar t_2 \lambda_{11}-\gamma\hbar t_2 \lambda_{12}-\gamma\hbar t_2 \lambda_{21}-\gamma\hbar t_2 \lambda_{22}-\gamma\hbar t_3 \lambda_{31}-\gamma\hbar t_3 \lambda_{32}} \\
&\quad \Big(4\, e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}}\, \hbar^2\, a_{\$24}\, x_{\$25}\, y_{\$21}\, \gamma_{11}\, \gamma_{22} - \\
&\quad 2\, e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}}\, \gamma\, \hbar^3\, x_{\$25}^2\, y_{\$21}^2\, \gamma_{11}^2\, \gamma_{22} - 2\, e^{\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{32}}\, \gamma\, \hbar^3\, x_{\$25}^2\, y_{\$21}^2\, \gamma_{11}\, \gamma_{22}^2 + \\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}}\, \gamma\, \hbar^4\, t_2\, x_{\$25}^2\, y_{\$21}^2\, \gamma_{11}^2\, \gamma_{22}^2 + \\
&\quad 4\, e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}}\, \hbar^2\, a_{\$24}\, x_3\, y_{\$21}\, \gamma_{11}\, \gamma_{23} - \\
&\quad 2\, e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}}\, \gamma\, \hbar^3\, x_3\, x_{\$25}\, y_{\$21}^2\, \gamma_{11}^2\, \gamma_{23} - 4\, e^{\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{32}}\, \gamma\, \hbar^3\, x_3\, x_{\$25}\, y_{\$21}^2\, \gamma_{11}\, \gamma_{22}\, \gamma_{23} + \\
&\quad 2\, e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}}\, \gamma\, \hbar^4\, t_2\, x_3\, x_{\$25}\, y_{\$21}^2\, \gamma_{11}^2\, \gamma_{22}\, \gamma_{23} - \\
&\quad 2\, e^{\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{32}}\, \gamma\, \hbar^3\, x_3^2\, y_{\$21}^2\, \gamma_{11}\, \gamma_{23}^2 + e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}}\, \gamma \\
&\quad \hbar^4\, t_2\, x_3^2\, y_{\$21}^2\, \gamma_{11}^2\, \gamma_{23}^2 + 4\, e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}}\, \hbar^2\, a_{\$24}\, x_{\$25}\, y_3\, \gamma_{22}\, \gamma_{31} - \\
&\quad 4\, e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}}\, \gamma\, \hbar^3\, x_{\$25}^2\, y_3\, y_{\$21}\, \gamma_{11}\, \gamma_{22}\, \gamma_{31} - 2\, e^{\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{32}}\, \gamma\, \hbar^3\, x_{\$25}^2\, y_3\, y_{\$21}\, \gamma_{22}^2\, \gamma_{31} + \\
&\quad 2\, e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}}\, \gamma\, \hbar^4\, t_2\, x_{\$25}^2\, y_3\, y_{\$21}\, \gamma_{11}\, \gamma_{22}^2\, \gamma_{31} + \\
&\quad 4\, e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}}\, \hbar^2\, a_{\$24}\, x_3\, y_3\, \gamma_{23}\, \gamma_{31} - 4\, e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \\
&\quad \gamma\, \hbar^3\, x_3\, x_{\$25}\, y_3\, y_{\$21}\, \gamma_{11}\, \gamma_{23}\, \gamma_{31} - 4\, e^{\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{32}}\, \gamma\, \hbar^3\, x_3\, x_{\$25}\, y_3\, y_{\$21}\, \gamma_{22}\, \gamma_{23}\, \gamma_{31} + \\
&\quad 4\, e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}}\, \gamma\, \hbar^4\, t_2\, x_3\, x_{\$25}\, y_3\, y_{\$21}\, \gamma_{11}\, \gamma_{22}\, \gamma_{23}\, \gamma_{31} - \\
&\quad 2\, e^{\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{32}}\, \gamma\, \hbar^3\, x_3^2\, y_3\, y_{\$21}\, \gamma_{23}^2\, \gamma_{31} + 2\, e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}} \\
&\quad \gamma\, \hbar^4\, t_2\, x_3^2\, y_3\, y_{\$21}\, \gamma_{11}\, \gamma_{23}^2\, \gamma_{31} - 2\, e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}}\, \gamma\, \hbar^3\, x_{\$25}^2\, y_3^2\, \gamma_{22}\, \gamma_{31}^2 + \\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}}\, \gamma\, \hbar^4\, t_2\, x_{\$25}^2\, y_3^2\, \gamma_{22}^2\, \gamma_{31}^2 - 2\, e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_3 \lambda_{31}} \\
&\quad \gamma\, \hbar^3\, x_3\, x_{\$25}\, y_3^2\, \gamma_{23}\, \gamma_{31}^2 + 2\, e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}}\, \gamma\, \hbar^4\, t_2\, x_3\, x_{\$25}\, y_3^2\, \gamma_{22}\, \gamma_{23}\, \gamma_{31}^2 + \\
&\quad e^{\gamma\hbar t_2 \lambda_{11}+\gamma\hbar t_2 \lambda_{12}+\gamma\hbar t_2 \lambda_{21}+\gamma\hbar t_2 \lambda_{22}+\gamma\hbar t_3 \lambda_{31}+\gamma\hbar t_3 \lambda_{32}}\, \gamma\, \hbar^4\, t_2\, x_3^2\, y_3^2\, \gamma_{23}^2\, \gamma_{31}^2\Big)\, \epsilon + O[\epsilon]^2\Big]
\end{aligned}
$$

```
Collect[(x + y)^5, {x, y}]
```

$x^5 + 5 x^4 y + 10 x^3 y^2 + 10 x^2 y^3 + 5 x y^4 + y^5$

```
{Q, P} = Take[List @@
```

$$\mathfrak{C}_{CU}\Big[\{y_3, a_3, x_3\}_3, \{y_{\$21}, a_{\$24}, x_{\$25}\}_2, \frac{1}{1+\hbar t_2 \gamma_{21}} e^{-\gamma \hbar t_2 \lambda_{11}-\gamma \hbar t_2 \lambda_{12}-\gamma \hbar t_2 \lambda_{21}-\gamma \hbar t_2 \lambda_{22}-\gamma \hbar t_3 \lambda_{31}-\gamma \hbar t_3 \lambda_{32}}$$

$$\Big(e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar x_{\$25} y_{\$21} \gamma_{11} + e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}}$$
$$\hbar x_{\$25} y_{\$21} \gamma_{12} + e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar x_3 y_{\$21} \gamma_{13} +$$
$$\hbar x_{\$25} y_{\$21} \gamma_{21} + e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar^2 t_2 x_{\$25} y_{\$21} \gamma_{12} \gamma_{21} +$$
$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar^2 t_2 x_3 y_{\$21} \gamma_{13} \gamma_{21} +$$
$$e^{\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{32}} \hbar x_{\$25} y_{\$21} \gamma_{22} - e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}}$$
$$\hbar^2 t_2 x_{\$25} y_{\$21} \gamma_{11} \gamma_{22} + e^{\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{32}} \hbar x_3 y_{\$21} \gamma_{23} -$$
$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar^2 t_2 x_3 y_{\$21} \gamma_{11} \gamma_{23} +$$
$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \hbar x_{\$25} y_3 \gamma_{31} - e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar^2$$
$$t_2 x_{\$25} y_3 \gamma_{22} \gamma_{31} - e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar^2 t_2 x_3 y_3 \gamma_{23} \gamma_{31} +$$
$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar x_{\$25} y_3 \gamma_{32} +$$
$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar^2 t_2 x_{\$25} y_3 \gamma_{21} \gamma_{32} +$$
$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar x_3 y_3 \gamma_{33} +$$
$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar^2 t_2 x_3 y_3 \gamma_{21} \gamma_{33} +$$
$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar a_{\$24} t_2 \lambda_{11} +$$
$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar^2 a_{\$24} t_2^2 \gamma_{21} \lambda_{11} +$$
$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar a_{\$24} t_2 \lambda_{12} +$$
$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar^2 a_{\$24} t_2^2 \gamma_{21} \lambda_{12} +$$
$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar a_3 t_2 \lambda_{13} +$$
$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar^2 a_3 t_2^2 \gamma_{21} \lambda_{13} +$$
$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar a_{\$24} t_2 \lambda_{21} +$$
$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar^2 a_{\$24} t_2^2 \gamma_{21} \lambda_{21} +$$
$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar a_{\$24} t_2 \lambda_{22} +$$
$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar^2 a_{\$24} t_2^2 \gamma_{21} \lambda_{22} +$$
$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar a_3 t_2 \lambda_{23} +$$
$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar^2 a_3 t_2^2 \gamma_{21} \lambda_{23} +$$
$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar a_{\$24} t_3 \lambda_{31} +$$
$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar^2 a_{\$24} t_2 t_3 \gamma_{21} \lambda_{31} +$$
$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar a_{\$24} t_3 \lambda_{32} +$$
$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar^2 a_{\$24} t_2 t_3 \gamma_{21} \lambda_{32} +$$
$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar a_3 t_3 \lambda_{33} +$$
$$e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar^2 a_3 t_2 t_3 \gamma_{21} \lambda_{33}\Big),$$

$$\frac{1}{1+\hbar t_2 \gamma_{21}} + \frac{1}{2\left(1+\hbar t_2 \gamma_{21}\right)} e^{-\gamma \hbar t_2 \lambda_{11}-\gamma \hbar t_2 \lambda_{12}-\gamma \hbar t_2 \lambda_{21}-\gamma \hbar t_2 \lambda_{22}-\gamma \hbar t_3 \lambda_{31}-\gamma \hbar t_3 \lambda_{32}}$$

$$\Big(4 e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar^2 a_{\$24} x_{\$25} y_{\$21} \gamma_{11} \gamma_{22} -$$
$$2 e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \gamma \hbar^3 x_{\$25}^2 y_{\$21}^2 \gamma_{11}^2 \gamma_{22} - 2 e^{\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{32}} \gamma \hbar^3 x_{\$25}^2$$
$$y_{\$21}^2 \gamma_{11} \gamma_{22}^2 + e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \gamma \hbar^4 t_2 x_{\$25}^2 y_{\$21}^2 \gamma_{11}^2 \gamma_{22}^2 +$$
$$4 e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar^2 a_{\$24} x_3 y_{\$21} \gamma_{11} \gamma_{23} -$$
$$2 e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \gamma \hbar^3 x_3 x_{\$25} y_{\$21}^2 \gamma_{11}^2 \gamma_{23} - 4 e^{\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{32}} \gamma \hbar^3 x_3 x_{\$25} y_{\$21}^2$$
$$\gamma_{11} \gamma_{22} \gamma_{23} + 2 e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \gamma \hbar^4 t_2 x_3 x_{\$25} y_{\$21}^2 \gamma_{11}^2 \gamma_{22} \gamma_{23} -$$
$$2 e^{\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{32}} \gamma \hbar^3 x_3^2 y_{\$21}^2 \gamma_{11} \gamma_{23}^2 + e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}}$$
$$\gamma \hbar^4 t_2 x_3^2 y_{\$21}^2 \gamma_{11}^2 \gamma_{23}^2 + 4 e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \hbar^2 a_{\$24} x_{\$25} y_3$$
$$\gamma_{22} \gamma_{31} - 4 e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_3 \lambda_{31}} \gamma \hbar^3 x_{\$25}^2 y_3 y_{\$21} \gamma_{11} \gamma_{22} \gamma_{31} - 2 e^{\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{32}}$$
$$\gamma \hbar^3 x_{\$25}^2 y_3 y_{\$21} \gamma_{22}^2 \gamma_{31} + 2 e^{\gamma \hbar t_2 \lambda_{11}+\gamma \hbar t_2 \lambda_{12}+\gamma \hbar t_2 \lambda_{21}+\gamma \hbar t_2 \lambda_{22}+\gamma \hbar t_3 \lambda_{31}+\gamma \hbar t_3 \lambda_{32}} \gamma \hbar^4 t_2 x_{\$25}^2 y_3$$

$$y_{\$21}\,\gamma_{11}\,\gamma_{22}^2\,\gamma_{31} + 4\,e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{12}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_2\lambda_{22}+\gamma\hbar t_3\lambda_{31}+\gamma\hbar t_3\lambda_{32}}\,\hbar^2\,a_{\$24}\,x_3\,y_3\,\gamma_{23}\,\gamma_{31} - 4\,e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\,\gamma\,\hbar^3\,x_3\,x_{\$25}\,y_3\,y_{\$21}\,\gamma_{11}\,\gamma_{23}\,\gamma_{31} - 4\,e^{\gamma\hbar t_2\lambda_{12}+\gamma\hbar t_2\lambda_{22}+\gamma\hbar t_3\lambda_{32}}\,\gamma\,\hbar^3\,x_3\,x_{\$25}\,y_3\,y_{\$21}\,\gamma_{22}\,\gamma_{23}\,\gamma_{31} + 4\,e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{12}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_2\lambda_{22}+\gamma\hbar t_3\lambda_{31}+\gamma\hbar t_3\lambda_{32}}\,\gamma\,\hbar^4\,t_2\,x_3\,x_{\$25}\,y_3\,y_{\$21}\,\gamma_{11}\,\gamma_{22}\,\gamma_{23}\,\gamma_{31} - 2\,e^{\gamma\hbar t_2\lambda_{12}+\gamma\hbar t_2\lambda_{22}+\gamma\hbar t_3\lambda_{32}}\,\gamma\,\hbar^3\,x_3^2\,y_3\,y_{\$21}\,\gamma_{23}^2\,\gamma_{31} + 2\,e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{12}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_2\lambda_{22}+\gamma\hbar t_3\lambda_{31}+\gamma\hbar t_3\lambda_{32}}\,\gamma\,\hbar^4\,t_2\,x_3^2\,y_3\,y_{\$21}\,\gamma_{11}\,\gamma_{23}^2\,\gamma_{31} - 2\,e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\,\gamma\,\hbar^3\,x_{\$25}^2\,y_3^2\,\gamma_{22}\,\gamma_{31}^2 + e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{12}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_2\lambda_{22}+\gamma\hbar t_3\lambda_{31}+\gamma\hbar t_3\lambda_{32}}\,\gamma\,\hbar^4\,t_2\,x_{\$25}^2\,y_3^2\,\gamma_{22}^2\,\gamma_{31}^2 - 2\,e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\,\gamma\,\hbar^3\,x_3\,x_{\$25}\,y_3^2\,\gamma_{23}\,\gamma_{31}^2 + 2\,e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{12}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_2\lambda_{22}+\gamma\hbar t_3\lambda_{31}+\gamma\hbar t_3\lambda_{32}}\,\gamma\,\hbar^4\,t_2\,x_3\,x_{\$25}\,y_3^2\,\gamma_{22}\,\gamma_{23}\,\gamma_{31}^2 + e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{12}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_2\lambda_{22}+\gamma\hbar t_3\lambda_{31}+\gamma\hbar t_3\lambda_{32}}\,\gamma\,\hbar^4\,t_2\,x_3^2\,y_3^2\,\gamma_{23}^2\,\gamma_{31}^2\Big)\,\epsilon + O[\epsilon]^2\Big],\ -2\Big];$$

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Expand@Collect[Q, {x_, y_, a_}, CC] /. CC → ExpandDenominator@*ExpandNumerator@*Together
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$$\Big(x_{\$25}\,y_{\$21}\,\Big(e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\,\hbar\,\gamma_{11} + e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{12}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_2\lambda_{22}+\gamma\hbar t_3\lambda_{31}+\gamma\hbar t_3\lambda_{32}}\,\hbar\,\gamma_{12} + \hbar\,\gamma_{21} + e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{12}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_2\lambda_{22}+\gamma\hbar t_3\lambda_{31}+\gamma\hbar t_3\lambda_{32}}\,\hbar^2\,t_2\,\gamma_{12}\,\gamma_{21} + e^{\gamma\hbar t_2\lambda_{12}+\gamma\hbar t_2\lambda_{22}+\gamma\hbar t_3\lambda_{32}}\,\hbar\,\gamma_{22} - e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{12}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_2\lambda_{22}+\gamma\hbar t_3\lambda_{31}+\gamma\hbar t_3\lambda_{32}}\,\hbar^2\,t_2\,\gamma_{11}\,\gamma_{22}\Big)\Big) \Big/ \Big(e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{12}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_2\lambda_{22}+\gamma\hbar t_3\lambda_{31}+\gamma\hbar t_3\lambda_{32}} + e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{12}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_2\lambda_{22}+\gamma\hbar t_3\lambda_{31}+\gamma\hbar t_3\lambda_{32}}\,\hbar\,t_2\,\gamma_{21}\Big) + \Big(x_3\,y_{\$21}\,\Big(e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\,\hbar\,\gamma_{13} + e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\,\hbar^2\,t_2\,\gamma_{13}\,\gamma_{21} + \hbar\,\gamma_{23} - e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\,\hbar^2\,t_2\,\gamma_{11}\,\gamma_{23}\Big)\Big) \Big/ \Big(e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}} + e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\,\hbar\,t_2\,\gamma_{21}\Big) + \Big(x_{\$25}\,y_3\,\Big(\hbar\,\gamma_{31} - e^{\gamma\hbar t_2\lambda_{12}+\gamma\hbar t_2\lambda_{22}+\gamma\hbar t_3\lambda_{32}}\,\hbar^2\,t_2\,\gamma_{22}\,\gamma_{31} + e^{\gamma\hbar t_2\lambda_{12}+\gamma\hbar t_2\lambda_{22}+\gamma\hbar t_3\lambda_{32}}\,\hbar\,\gamma_{32} + e^{\gamma\hbar t_2\lambda_{12}+\gamma\hbar t_2\lambda_{22}+\gamma\hbar t_3\lambda_{32}}\,\hbar^2\,t_2\,\gamma_{21}\,\gamma_{32}\Big)\Big) \Big/ \Big(e^{\gamma\hbar t_2\lambda_{12}+\gamma\hbar t_2\lambda_{22}+\gamma\hbar t_3\lambda_{32}} + e^{\gamma\hbar t_2\lambda_{12}+\gamma\hbar t_2\lambda_{22}+\gamma\hbar t_3\lambda_{32}}\,\hbar\,t_2\,\gamma_{21}\Big) + \frac{x_3\,y_3\,\Big(-\hbar^2\,t_2\,\gamma_{23}\,\gamma_{31} + \hbar\,\gamma_{33} + \hbar^2\,t_2\,\gamma_{21}\,\gamma_{33}\Big)}{1 + \hbar\,t_2\,\gamma_{21}} + a_{\$24}\,\Big(\hbar\,t_2\,\lambda_{11} + \hbar\,t_2\,\lambda_{12} + \hbar\,t_2\,\lambda_{21} + \hbar\,t_2\,\lambda_{22} + \hbar\,t_3\,\lambda_{31} + \hbar\,t_3\,\lambda_{32}\Big) + a_3\,\Big(\hbar\,t_2\,\lambda_{13} + \hbar\,t_2\,\lambda_{23} + \hbar\,t_3\,\lambda_{33}\Big)$$

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Expand@Collect[Normal@P, {x_, y_, a_}, CC] /.
 CC → ExpandDenominator@*ExpandNumerator@*Together
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$$\frac{1}{1+\hbar\, t_2\, \gamma_{21}}+\frac{2\, \epsilon\, \hbar^2\, a_{\$24}\, x_{\$25}\, y_{\$21}\, \gamma_{11}\, \gamma_{22}}{1+\hbar\, t_2\, \gamma_{21}}+$$
$$\left(x_{\$25}^2\, y_{\$21}^2\, \left(-2\, e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\, \gamma\, \epsilon\, \hbar^3\, \gamma_{11}^2\, \gamma_{22}-2\, e^{\gamma\hbar t_2\lambda_{12}+\gamma\hbar t_2\lambda_{22}+\gamma\hbar t_3\lambda_{32}}\, \gamma\, \epsilon\, \hbar^3\, \gamma_{11}\, \gamma_{22}^2+ e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{12}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_2\lambda_{22}+\gamma\hbar t_3\lambda_{31}+\gamma\hbar t_3\lambda_{32}}\, \gamma\, \epsilon\, \hbar^4\, t_2\, \gamma_{11}^2\, \gamma_{22}^2\right)\right) \Big/ \left(2\, e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{12}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_2\lambda_{22}+\gamma\hbar t_3\lambda_{31}+\gamma\hbar t_3\lambda_{32}}+ 2\, e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{12}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_2\lambda_{22}+\gamma\hbar t_3\lambda_{31}+\gamma\hbar t_3\lambda_{32}}\, \hbar\, t_2\, \gamma_{21}\right)+\frac{2\, \epsilon\, \hbar^2\, a_{\$24}\, x_3\, y_{\$21}\, \gamma_{11}\, \gamma_{23}}{1+\hbar\, t_2\, \gamma_{21}}+$$
$$\left(x_3\, x_{\$25}\, y_{\$21}^2\, \left(-e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\, \gamma\, \epsilon\, \hbar^3\, \gamma_{11}^2\, \gamma_{23}-2\, e^{\gamma\hbar t_2\lambda_{12}+\gamma\hbar t_2\lambda_{22}+\gamma\hbar t_3\lambda_{32}}\, \gamma\, \epsilon\, \hbar^3\, \gamma_{11}\, \gamma_{22}\, \gamma_{23}+ e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{12}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_2\lambda_{22}+\gamma\hbar t_3\lambda_{31}+\gamma\hbar t_3\lambda_{32}}\, \gamma\, \epsilon\, \hbar^4\, t_2\, \gamma_{11}^2\, \gamma_{22}\, \gamma_{23}\right)\right) \Big/ \left(e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{12}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_2\lambda_{22}+\gamma\hbar t_3\lambda_{31}+\gamma\hbar t_3\lambda_{32}}+ e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{12}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_2\lambda_{22}+\gamma\hbar t_3\lambda_{31}+\gamma\hbar t_3\lambda_{32}}\, \hbar\, t_2\, \gamma_{21}\right)+$$
$$\left(x_3^2\, y_{\$21}^2\, \left(-2\, \gamma\, \epsilon\, \hbar^3\, \gamma_{11}\, \gamma_{23}^2+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\, \gamma\, \epsilon\, \hbar^4\, t_2\, \gamma_{11}^2\, \gamma_{23}^2\right)\right) \Big/ \left(2\, e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}+2\, e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\, \hbar\, t_2\, \gamma_{21}\right)+$$
$$\frac{2\, \epsilon\, \hbar^2\, a_{\$24}\, x_{\$25}\, y_3\, \gamma_{22}\, \gamma_{31}}{1+\hbar\, t_2\, \gamma_{21}}+\frac{2\, \epsilon\, \hbar^2\, a_{\$24}\, x_3\, y_3\, \gamma_{23}\, \gamma_{31}}{1+\hbar\, t_2\, \gamma_{21}}+$$
$$\frac{\gamma\, \epsilon\, \hbar^4\, t_2\, x_3^2\, y_3^2\, \gamma_{23}^2\, \gamma_{31}^2}{2+2\, \hbar\, t_2\, \gamma_{21}}+$$
$$\left(x_{\$25}^2\, y_3\, y_{\$21}\, \left(-2\, e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\, \gamma\, \epsilon\, \hbar^3\, \gamma_{11}\, \gamma_{22}\, \gamma_{31}-e^{\gamma\hbar t_2\lambda_{12}+\gamma\hbar t_2\lambda_{22}+\gamma\hbar t_3\lambda_{32}}\, \gamma\, \epsilon\, \hbar^3\, \gamma_{22}^2\, \gamma_{31}+ e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{12}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_2\lambda_{22}+\gamma\hbar t_3\lambda_{31}+\gamma\hbar t_3\lambda_{32}}\, \gamma\, \epsilon\, \hbar^4\, t_2\, \gamma_{11}\, \gamma_{22}^2\, \gamma_{31}\right)\right) \Big/ \left(e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{12}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_2\lambda_{22}+\gamma\hbar t_3\lambda_{31}+\gamma\hbar t_3\lambda_{32}}+ e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{12}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_2\lambda_{22}+\gamma\hbar t_3\lambda_{31}+\gamma\hbar t_3\lambda_{32}}\, \hbar\, t_2\, \gamma_{21}\right)+$$
$$\left(x_3\, x_{\$25}\, y_3\, y_{\$21}\, \left(-2\, e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\, \gamma\, \epsilon\, \hbar^3\, \gamma_{11}\, \gamma_{23}\, \gamma_{31}-2\, e^{\gamma\hbar t_2\lambda_{12}+\gamma\hbar t_2\lambda_{22}+\gamma\hbar t_3\lambda_{32}}\, \gamma\, \epsilon\, \hbar^3\, \gamma_{22}\, \gamma_{23}\, \gamma_{31}+2\, e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{12}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_2\lambda_{22}+\gamma\hbar t_3\lambda_{31}+\gamma\hbar t_3\lambda_{32}}\, \gamma\, \epsilon\, \hbar^4\, t_2\, \gamma_{11}\, \gamma_{22}\, \gamma_{23}\, \gamma_{31}\right)\right) \Big/ \left(e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{12}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_2\lambda_{22}+\gamma\hbar t_3\lambda_{31}+\gamma\hbar t_3\lambda_{32}}+ e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{12}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_2\lambda_{22}+\gamma\hbar t_3\lambda_{31}+\gamma\hbar t_3\lambda_{32}}\, \hbar\, t_2\, \gamma_{21}\right)+$$
$$\left(x_3^2\, y_3\, y_{\$21}\, \left(-\gamma\, \epsilon\, \hbar^3\, \gamma_{23}^2\, \gamma_{31}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\, \gamma\, \epsilon\, \hbar^4\, t_2\, \gamma_{11}\, \gamma_{23}^2\, \gamma_{31}\right)\right) \Big/ \left(e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}+e^{\gamma\hbar t_2\lambda_{11}+\gamma\hbar t_2\lambda_{21}+\gamma\hbar t_3\lambda_{31}}\, \hbar\, t_2\, \gamma_{21}\right)+$$
$$\left(x_{\$25}^2\, y_3^2\, \left(-2\, \gamma\, \epsilon\, \hbar^3\, \gamma_{22}\, \gamma_{31}^2+e^{\gamma\hbar t_2\lambda_{12}+\gamma\hbar t_2\lambda_{22}+\gamma\hbar t_3\lambda_{32}}\, \gamma\, \epsilon\, \hbar^4\, t_2\, \gamma_{22}^2\, \gamma_{31}^2\right)\right) \Big/ \left(2\, e^{\gamma\hbar t_2\lambda_{12}+\gamma\hbar t_2\lambda_{22}+\gamma\hbar t_3\lambda_{32}}+2\, e^{\gamma\hbar t_2\lambda_{12}+\gamma\hbar t_2\lambda_{22}+\gamma\hbar t_3\lambda_{32}}\, \hbar\, t_2\, \gamma_{21}\right)+$$
$$\left(x_3\, x_{\$25}\, y_3^2\, \left(-\gamma\, \epsilon\, \hbar^3\, \gamma_{23}\, \gamma_{31}^2+e^{\gamma\hbar t_2\lambda_{12}+\gamma\hbar t_2\lambda_{22}+\gamma\hbar t_3\lambda_{32}}\, \gamma\, \epsilon\, \hbar^4\, t_2\, \gamma_{22}\, \gamma_{23}\, \gamma_{31}^2\right)\right) \Big/ \left(e^{\gamma\hbar t_2\lambda_{12}+\gamma\hbar t_2\lambda_{22}+\gamma\hbar t_3\lambda_{32}}+e^{\gamma\hbar t_2\lambda_{12}+\gamma\hbar t_2\lambda_{22}+\gamma\hbar t_3\lambda_{32}}\, \hbar\, t_2\, \gamma_{21}\right)$$