Pensieve header: The $k=2$ building blocks.

In[•]:=
```
SetDirectory["C:\\drorbn\\AcademicPensieve\\Projects/SL2Invariant"];
<< SL2Invariant.m
$QZipFail = True;
Block[{$k = 2}, atoms = {
    am → am_{i,j→k}, bm → bm_{i,j→k}, dm → dm_{i,j→k}, R → R_{i,j}, R̄ → R̄_{i,j}, P → P_{i,j},
    aS → aS_i, āS → āS_i, bS → bS_i, b̄S → b̄S_i, dS → dS_i, aΔ → aΔ_{i→j,k}, bΔ → bΔ_{i→j,k},
    dΔ → dΔ_{i→j,k}, C → C_i, C̄ → C̄_i, Kink → Kink_i, K̄ink → K̄ink_i, b2t → b2t_i, t2b → t2b_i
  }] //
 Column
```

```
Loading KnotTheory` version of January 20, 2015, 10:42:19.1122.
Read more at http://katlas.org/wiki/KnotTheory.

This is Profile.m of http://www.drorbn.net/AcademicPensieve/Projects/Profile/.

This version: June 2018. Original version: July 1994.
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$$\text{am} \to \mathbb{E}_{\{i,j\}\to\{k\}}\left[a_k\ (\alpha_i+\alpha_j),\ x_k\ \left(e^{-\gamma\alpha_j}\xi_i+\xi_j\right),\ 1\right]$$

$$\text{bm} \to \mathbb{E}_{\{i,j\}\to\{k\}}\left[b_k\ (\beta_i+\beta_j),\ y_k\ (\eta_i+\eta_j),\ 1-y_k\beta_i\eta_j\epsilon+\frac{1}{2}\left(y_k\beta_i^2\eta_j+y_k^2\beta_i^2\eta_j^2\right)\epsilon^2+0[\epsilon]^3\right]$$

$$\begin{aligned}\text{dm} \to \mathbb{E}_{\{i,j\}\to\{k\}}\Big[&a_k\alpha_i+a_k\alpha_j+b_k\beta_i+b_k\beta_j,\ y_k\eta_i+\frac{y_k\eta_j}{\mathcal{A}_i}+\frac{x_k\xi_i}{\mathcal{A}_j}+\frac{(1-B_k)\eta_j\xi_i}{\hbar}+x_k\xi_j,\\ &1+\left(-\frac{y_k\beta_i\eta_j}{\mathcal{A}_i}-\frac{x_k\beta_j\xi_i}{\mathcal{A}_j}+a_kB_k\eta_j\xi_i+\frac{\gamma\hbar\,x_ky_k\eta_j\xi_i}{\mathcal{A}_i\mathcal{A}_j}+\frac{(\gamma-3\gamma B_k)\,y_k\eta_j^2\xi_i}{2\mathcal{A}_i}+\frac{(\gamma-3\gamma B_k)\,x_k\eta_j\xi_i^2}{2\mathcal{A}_j}+\frac{\left(\gamma-4\gamma B_k+3\gamma B_k^2\right)\eta_j^2\xi_i^2}{4\hbar}\right)\epsilon+\\ &\Bigg(\frac{y_k\beta_i^2\eta_j}{2\mathcal{A}_i}+\frac{y_k^2\beta_i^2\eta_j^2}{2\mathcal{A}_i^2}+\frac{x_k\beta_j^2\xi_i}{2\mathcal{A}_j}-\frac{1}{2}\hbar\,a_k^2B_k\eta_j\xi_i+\frac{\gamma^2\hbar^2x_ky_k\eta_j\xi_i}{2\mathcal{A}_i\mathcal{A}_j}-\frac{\gamma\hbar\,x_ky_k\beta_i\eta_j\xi_i}{\mathcal{A}_i\mathcal{A}_j}-\frac{\gamma\hbar\,x_ky_k\beta_j\eta_j\xi_i}{\mathcal{A}_i\mathcal{A}_j}+\frac{x_ky_k\beta_i\beta_j\eta_j\xi_i}{\mathcal{A}_i\mathcal{A}_j}+\\ &\frac{3\gamma\hbar\,a_kB_ky_k\eta_j^2\xi_i}{2\mathcal{A}_i}+\frac{\left(\gamma^2\hbar-5\gamma^2\hbar\,B_k\right)y_k\eta_j^2\xi_i}{4\mathcal{A}_i}+\frac{\gamma^2\hbar^2x_ky_k^2\eta_j^2\xi_i}{2\mathcal{A}_i^2\mathcal{A}_j}-\frac{a_kB_ky_k\beta_i\eta_j^2\xi_i}{\mathcal{A}_i}+\frac{(-\gamma+3\gamma B_k)\,y_k\beta_i\eta_j^2\xi_i}{2\mathcal{A}_i}-\frac{\gamma\hbar\,x_ky_k^2\beta_i\eta_j^2\xi_i}{\mathcal{A}_i^2\mathcal{A}_j}+\\ &\frac{\left(\gamma^2\hbar-7\gamma^2\hbar\,B_k\right)y_k^2\eta_j^3\xi_i}{6\mathcal{A}_i^2}+\frac{(-\gamma+3\gamma B_k)\,y_k^2\beta_i\eta_j^3\xi_i}{2\mathcal{A}_i^2}+\frac{x_k^2\beta_j^2\xi_i^2}{2\mathcal{A}_j^2}+\frac{\gamma^2\hbar^2x_k^2y_k\eta_j\xi_i^2}{2\mathcal{A}_i\mathcal{A}_j^2}+\frac{3\gamma\hbar\,a_kB_kx_k\eta_j\xi_i^2}{2\mathcal{A}_j}+\frac{\left(\gamma^2\hbar-5\gamma^2\hbar\,B_k\right)x_k\eta_j\xi_i^2}{4\mathcal{A}_j}-\\ &\frac{\gamma\hbar\,x_k^2y_k\beta_j\eta_j\xi_i^2}{\mathcal{A}_i\mathcal{A}_j^2}-\frac{a_kB_kx_k\beta_j\eta_j\xi_i^2}{\mathcal{A}_j}+\frac{(-\gamma+3\gamma B_k)\,x_k\beta_j\eta_j\xi_i^2}{2\mathcal{A}_j}+\frac{1}{2}a_k^2B_k^2\eta_j^2\xi_i^2+\frac{1}{2}a_k\left(2\gamma B_k-3\gamma B_k^2\right)\eta_j^2\xi_i^2+\\ &\frac{1}{8}\left(\gamma^2-6\gamma^2B_k+5\gamma^2B_k^2\right)\eta_j^2\xi_i^2+\frac{\gamma^2\hbar^2x_k^2y_k^2\eta_j^2\xi_i^2}{2\mathcal{A}_i^2\mathcal{A}_j^2}+\frac{\gamma\hbar\,a_kB_kx_ky_k\eta_j^2\xi_i^2}{\mathcal{A}_i\mathcal{A}_j}+\frac{\left(5\gamma^2\hbar-21\gamma^2\hbar\,B_k\right)x_ky_k\eta_j^2\xi_i^2}{4\mathcal{A}_i\mathcal{A}_j}+\\ &\frac{(-\gamma+3\gamma B_k)\,x_ky_k\beta_i\eta_j^2\xi_i^2}{2\mathcal{A}_i\mathcal{A}_j}+\frac{(-\gamma+3\gamma B_k)\,x_ky_k\beta_j\eta_j^2\xi_i^2}{2\mathcal{A}_i\mathcal{A}_j}+\frac{a_k\left(\gamma B_k-3\gamma B_k^2\right)y_k\eta_j^3\xi_i^2}{2\mathcal{A}_i}+\frac{\left(5\gamma^2-34\gamma^2B_k+41\gamma^2B_k^2\right)y_k\eta_j^3\xi_i^2}{12\mathcal{A}_i}+\\ &\frac{\left(\gamma^2\hbar-3\gamma^2\hbar\,B_k\right)x_ky_k^2\eta_j^3\xi_i^2}{2\mathcal{A}_i^2\mathcal{A}_j}+\frac{\left(-\gamma+4\gamma B_k-3\gamma B_k^2\right)y_k\beta_i\eta_j^3\xi_i^2}{4\hbar\,\mathcal{A}_i}+\frac{\left(\gamma^2-6\gamma^2B_k+9\gamma^2B_k^2\right)y_k^2\eta_j^4\xi_i^2}{8\mathcal{A}_i^2}+\frac{\left(\gamma^2\hbar-7\gamma^2\hbar\,B_k\right)x_k^2\eta_j\xi_i^3}{6\mathcal{A}_j^2}+\\ &\frac{(-\gamma+3\gamma B_k)\,x_k^2\beta_j\eta_j\xi_i^3}{2\mathcal{A}_j^2}+\frac{\left(\gamma^2\hbar-3\gamma^2\hbar\,B_k\right)x_k^2y_k\eta_j^2\xi_i^3}{2\mathcal{A}_i\mathcal{A}_j^2}+\frac{a_k\left(\gamma B_k-3\gamma B_k^2\right)x_k\eta_j^2\xi_i^3}{2\mathcal{A}_j}+\frac{\left(5\gamma^2-34\gamma^2B_k+41\gamma^2B_k^2\right)x_k\eta_j^2\xi_i^3}{12\mathcal{A}_j}+\\ &\frac{\left(-\gamma+4\gamma B_k-3\gamma B_k^2\right)x_k\beta_j\eta_j^2\xi_i^3}{4\hbar\,\mathcal{A}_j}+\frac{a_k\left(\gamma B_k-4\gamma B_k^2+3\gamma B_k^3\right)\eta_j^3\xi_i^3}{4\hbar}+\frac{\left(5\gamma^2-39\gamma^2B_k+75\gamma^2B_k^2-41\gamma^2B_k^3\right)\eta_j^3\xi_i^3}{36\hbar}+\\ &\frac{\left(\gamma^2-5\gamma^2B_k+6\gamma^2B_k^2\right)x_ky_k\eta_j^3\xi_i^3}{2\mathcal{A}_i\mathcal{A}_j}+\frac{\left(\gamma^2-7\gamma^2B_k+15\gamma^2B_k^2-9\gamma^2B_k^3\right)y_k\eta_j^4\xi_i^3}{8\hbar\,\mathcal{A}_i}+\frac{\left(\gamma^2-6\gamma^2B_k+9\gamma^2B_k^2\right)x_k^2\eta_j^2\xi_i^4}{8\mathcal{A}_j^2}+\\ &\frac{\left(\gamma^2-7\gamma^2B_k+15\gamma^2B_k^2-9\gamma^2B_k^3\right)x_k\eta_j^3\xi_i^4}{8\hbar\,\mathcal{A}_j}+\frac{\left(\gamma^2-8\gamma^2B_k+22\gamma^2B_k^2-24\gamma^2B_k^3+9\gamma^2B_k^4\right)\eta_j^4\xi_i^4}{32\hbar^2}\Bigg)\epsilon^2+0[\epsilon]^3\Big]\end{aligned}$$

$$R \to \mathbb{E}_{\{\}\to\{i,j\}}\left[\hbar\,a_j\,b_i,\ \hbar\,x_j\,y_i,\ 1-\frac{1}{4}\left(\gamma\hbar^3x_j^2y_i^2\right)\epsilon+\left(\frac{1}{9}\gamma^2\hbar^5x_j^3y_i^3+\frac{1}{32}\gamma^2\hbar^6x_j^4y_i^4\right)\epsilon^2+0[\epsilon]^3\right]$$

$$\begin{aligned}\bar{R} \to \mathbb{E}_{\{\}\to\{i,j\}}\Big[&-\hbar\,a_j\,b_i,\ -\frac{\hbar\,x_j\,y_i}{B_i},\ 1+\left(-\frac{\hbar^2a_jx_jy_i}{B_i}-\frac{3\gamma\hbar^3x_j^2y_i^2}{4B_i^2}\right)\epsilon+\\ &\left(-\frac{\hbar^3a_j^2x_jy_i}{2B_i}+\frac{\gamma^2\hbar^4x_j^2y_i^2}{2B_i^2}-\frac{3\gamma\hbar^4a_jx_j^2y_i^2}{2B_i^2}+\frac{\hbar^4a_j^2x_j^2y_i^2}{2B_i^2}-\frac{10\gamma^2\hbar^5x_j^3y_i^3}{9B_i^3}+\frac{3\gamma\hbar^5a_jx_j^3y_i^3}{4B_i^3}+\frac{9\gamma^2\hbar^6x_j^4y_i^4}{32B_i^4}\right)\epsilon^2+0[\epsilon]^3\Big]\end{aligned}$$

$$P \to \mathbb{E}_{\{i,j\}\to\{\}}\left[\frac{\alpha_j\beta_i}{\hbar},\ \frac{\eta_i\xi_j}{\hbar},\ 1+\frac{\gamma\eta_i^2\xi_j^2\epsilon}{4\hbar}+\left(\frac{1}{8}\gamma^2\eta_i^2\xi_j^2+\frac{\gamma^2\eta_i^3\xi_j^3}{4\hbar}+\frac{\gamma^2\eta_i^4\xi_j^4}{16\hbar^2}-\frac{\gamma^2\left(32\hbar\,\eta_i^3\xi_j^3+9\eta_i^4\xi_j^4\right)}{288\hbar^2}\right)\epsilon^2+0[\epsilon]^3\right]$$

$$\mathsf{aS} \to \mathbb{E}_{\{\mathbf{i}\}\to\{\mathbf{i}\}}\Big[-\mathsf{a}_\mathbf{i}\,\alpha_\mathbf{i},\ -\mathsf{x}_\mathbf{i}\,\mathcal{A}_\mathbf{i}\,\xi_\mathbf{i},\ 1+\Big(-\hbar\,\mathsf{a}_\mathbf{i}\,\mathsf{x}_\mathbf{i}\,\mathcal{A}_\mathbf{i}\,\xi_\mathbf{i}-\frac{1}{2}\,\gamma\,\hbar\,\mathsf{x}_\mathbf{i}^2\,\mathcal{A}_\mathbf{i}^2\,\xi_\mathbf{i}^2\Big)\,\epsilon+\Big(-\frac{1}{2}\,\hbar^2\,\mathsf{a}_\mathbf{i}^2\,\mathsf{x}_\mathbf{i}\,\mathcal{A}_\mathbf{i}\,\xi_\mathbf{i}+\frac{1}{4}\,\gamma^2\,\hbar^2\,\mathsf{x}_\mathbf{i}^2\,\mathcal{A}_\mathbf{i}^2\,\xi_\mathbf{i}^2-\gamma\,\hbar^2\,\mathsf{a}_\mathbf{i}\,\mathsf{x}_\mathbf{i}^2\,\mathcal{A}_\mathbf{i}^2\,\xi_\mathbf{i}^2+\frac{1}{2}\,\hbar^2\,\mathsf{a}_\mathbf{i}^2\,\mathsf{x}_\mathbf{i}^2\,\mathcal{A}_\mathbf{i}^2\,\xi_\mathbf{i}^2-\frac{1}{2}\,\gamma^2\,\hbar^2\,\mathsf{x}_\mathbf{i}^3\,\mathcal{A}_\mathbf{i}^3\,\xi_\mathbf{i}^3+\frac{1}{2}\,\gamma\,\hbar^2\,\mathsf{a}_\mathbf{i}\,\mathsf{x}_\mathbf{i}^3\,\mathcal{A}_\mathbf{i}^3\,\xi_\mathbf{i}^3+\frac{1}{8}\,\gamma^2\,\hbar^2\,\mathsf{x}_\mathbf{i}^4\,\mathcal{A}_\mathbf{i}^4\,\xi_\mathbf{i}^4\Big)\,\epsilon^2+0[\epsilon]^3\Big]$$

$$\overline{\mathsf{aS}} \to \mathbb{E}_{\{\mathbf{i}\}\to\{\mathbf{i}\}}\Big[-\mathsf{a}_\mathbf{i}\,\alpha_\mathbf{i},\ -\mathsf{x}_\mathbf{i}\,\mathcal{A}_\mathbf{i}\,\xi_\mathbf{i},\ 1+\Big(\gamma\,\hbar\,\mathsf{x}_\mathbf{i}\,\mathcal{A}_\mathbf{i}\,\xi_\mathbf{i}-\hbar\,\mathsf{a}_\mathbf{i}\,\mathsf{x}_\mathbf{i}\,\mathcal{A}_\mathbf{i}\,\xi_\mathbf{i}-\frac{1}{2}\,\gamma\,\hbar\,\mathsf{x}_\mathbf{i}^2\,\mathcal{A}_\mathbf{i}^2\,\xi_\mathbf{i}^2\Big)\,\epsilon+\Big(-\gamma^2\,\hbar^2\,\mathsf{x}_\mathbf{i}\,\mathcal{A}_\mathbf{i}\,\xi_\mathbf{i}+2\,\gamma\,\hbar^2\,\mathsf{a}_\mathbf{i}\,\mathsf{x}_\mathbf{i}\,\mathcal{A}_\mathbf{i}\,\xi_\mathbf{i}-\hbar^2\,\mathsf{a}_\mathbf{i}^2\,\mathsf{x}_\mathbf{i}\,\mathcal{A}_\mathbf{i}\,\xi_\mathbf{i}+\frac{7}{2}\,\gamma^2\,\hbar^2\,\mathsf{x}_\mathbf{i}^2\,\mathcal{A}_\mathbf{i}^2\,\xi_\mathbf{i}^2-4\,\gamma\,\hbar^2\,\mathsf{a}_\mathbf{i}\,\mathsf{x}_\mathbf{i}^2\,\mathcal{A}_\mathbf{i}^2\,\xi_\mathbf{i}^2+\hbar^2\,\mathsf{a}_\mathbf{i}^2\,\mathsf{x}_\mathbf{i}^2\,\mathcal{A}_\mathbf{i}^2\,\xi_\mathbf{i}^2-2\,\gamma^2\,\hbar^2\,\mathsf{x}_\mathbf{i}^3\,\mathcal{A}_\mathbf{i}^3\,\xi_\mathbf{i}^3+\gamma\,\hbar^2\,\mathsf{a}_\mathbf{i}\,\mathsf{x}_\mathbf{i}^3\,\mathcal{A}_\mathbf{i}^3\,\xi_\mathbf{i}^3+\frac{1}{4}\,\gamma^2\,\hbar^2\,\mathsf{x}_\mathbf{i}^4\,\mathcal{A}_\mathbf{i}^4\,\xi_\mathbf{i}^4+\frac{1}{8}\,\Big(4\,\gamma^2\,\hbar^2\,\mathsf{x}_\mathbf{i}\,\mathcal{A}_\mathbf{i}\,\xi_\mathbf{i}-8\,\gamma\,\hbar^2\,\mathsf{a}_\mathbf{i}\,\mathsf{x}_\mathbf{i}\,\mathcal{A}_\mathbf{i}\,\xi_\mathbf{i}+4\,\hbar^2\,\mathsf{a}_\mathbf{i}^2\,\mathsf{x}_\mathbf{i}\,\mathcal{A}_\mathbf{i}\,\xi_\mathbf{i}-14\,\gamma^2\,\hbar^2\,\mathsf{x}_\mathbf{i}^2\,\mathcal{A}_\mathbf{i}^2\,\xi_\mathbf{i}^2+16\,\gamma\,\hbar^2\,\mathsf{a}_\mathbf{i}\,\mathsf{x}_\mathbf{i}^2\,\mathcal{A}_\mathbf{i}^2\,\xi_\mathbf{i}^2-4\,\hbar^2\,\mathsf{a}_\mathbf{i}^2\,\mathsf{x}_\mathbf{i}^2\,\mathcal{A}_\mathbf{i}^2\,\xi_\mathbf{i}^2+8\,\gamma^2\,\hbar^2\,\mathsf{x}_\mathbf{i}^3\,\mathcal{A}_\mathbf{i}^3\,\xi_\mathbf{i}^3-4\,\gamma\,\hbar^2\,\mathsf{a}_\mathbf{i}\,\mathsf{x}_\mathbf{i}^3\,\mathcal{A}_\mathbf{i}^3\,\xi_\mathbf{i}^3-\gamma^2\,\hbar^2\,\mathsf{x}_\mathbf{i}^4\,\mathcal{A}_\mathbf{i}^4\,\xi_\mathbf{i}^4\Big)\Big)\,\epsilon^2+0[\epsilon]^3\Big]$$

$$\mathsf{bS} \to \mathbb{E}_{\{\mathbf{i}\}\to\{\mathbf{i}\}}\Big[-\mathsf{b}_\mathbf{i}\,\beta_\mathbf{i},\ -\frac{\mathsf{y}_\mathbf{i}\,\eta_\mathbf{i}}{\mathsf{B}_\mathbf{i}},\ 1+\Big(-\frac{\mathsf{y}_\mathbf{i}\,\beta_\mathbf{i}\,\eta_\mathbf{i}}{\mathsf{B}_\mathbf{i}}-\frac{\gamma\,\hbar\,\mathsf{y}_\mathbf{i}^2\,\eta_\mathbf{i}^2}{2\,\mathsf{B}_\mathbf{i}^2}\Big)\,\epsilon+\Big(-\frac{\mathsf{y}_\mathbf{i}\,\beta_\mathbf{i}^2\,\eta_\mathbf{i}}{2\,\mathsf{B}_\mathbf{i}}+\frac{\gamma^2\,\hbar^2\,\mathsf{y}_\mathbf{i}^2\,\eta_\mathbf{i}^2}{4\,\mathsf{B}_\mathbf{i}^2}-\frac{\gamma\,\hbar\,\mathsf{y}_\mathbf{i}^2\,\beta_\mathbf{i}\,\eta_\mathbf{i}^2}{\mathsf{B}_\mathbf{i}^2}+\frac{\mathsf{y}_\mathbf{i}^2\,\beta_\mathbf{i}^2\,\eta_\mathbf{i}^2}{2\,\mathsf{B}_\mathbf{i}^2}-\frac{\gamma^2\,\hbar^2\,\mathsf{y}_\mathbf{i}^3\,\eta_\mathbf{i}^3}{2\,\mathsf{B}_\mathbf{i}^3}+\frac{\gamma\,\hbar\,\mathsf{y}_\mathbf{i}^3\,\beta_\mathbf{i}\,\eta_\mathbf{i}^3}{2\,\mathsf{B}_\mathbf{i}^3}+\frac{\gamma^2\,\hbar^2\,\mathsf{y}_\mathbf{i}^4\,\eta_\mathbf{i}^4}{8\,\mathsf{B}_\mathbf{i}^4}\Big)\,\epsilon^2+0[\epsilon]^3\Big]$$

$$\overline{\mathsf{bS}} \to \mathbb{E}_{\{\mathbf{i}\}\to\{\mathbf{i}\}}\Big[-\mathsf{b}_\mathbf{i}\,\beta_\mathbf{i},\ -\frac{\mathsf{y}_\mathbf{i}\,\eta_\mathbf{i}}{\mathsf{B}_\mathbf{i}},\ 1+\Big(\frac{\gamma\,\hbar\,\mathsf{y}_\mathbf{i}\,\eta_\mathbf{i}}{\mathsf{B}_\mathbf{i}}-\frac{\mathsf{y}_\mathbf{i}\,\beta_\mathbf{i}\,\eta_\mathbf{i}}{\mathsf{B}_\mathbf{i}}-\frac{\gamma\,\hbar\,\mathsf{y}_\mathbf{i}^2\,\eta_\mathbf{i}^2}{2\,\mathsf{B}_\mathbf{i}^2}\Big)\,\epsilon+\Big(-\frac{\gamma^2\,\hbar^2\,\mathsf{y}_\mathbf{i}\,\eta_\mathbf{i}}{2\,\mathsf{B}_\mathbf{i}}+\frac{\gamma\,\hbar\,\mathsf{y}_\mathbf{i}\,\beta_\mathbf{i}\,\eta_\mathbf{i}}{\mathsf{B}_\mathbf{i}}-\frac{\mathsf{y}_\mathbf{i}\,\beta_\mathbf{i}^2\,\eta_\mathbf{i}}{2\,\mathsf{B}_\mathbf{i}}+\frac{7\,\gamma^2\,\hbar^2\,\mathsf{y}_\mathbf{i}^2\,\eta_\mathbf{i}^2}{4\,\mathsf{B}_\mathbf{i}^2}-\frac{2\,\gamma\,\hbar\,\mathsf{y}_\mathbf{i}^2\,\beta_\mathbf{i}\,\eta_\mathbf{i}^2}{\mathsf{B}_\mathbf{i}^2}+\frac{\mathsf{y}_\mathbf{i}^2\,\beta_\mathbf{i}^2\,\eta_\mathbf{i}^2}{2\,\mathsf{B}_\mathbf{i}^2}-\frac{\gamma^2\,\hbar^2\,\mathsf{y}_\mathbf{i}^3\,\eta_\mathbf{i}^3}{\mathsf{B}_\mathbf{i}^3}+\frac{\gamma\,\hbar\,\mathsf{y}_\mathbf{i}^3\,\beta_\mathbf{i}\,\eta_\mathbf{i}^3}{2\,\mathsf{B}_\mathbf{i}^3}+\frac{\gamma^2\,\hbar^2\,\mathsf{y}_\mathbf{i}^4\,\eta_\mathbf{i}^4}{8\,\mathsf{B}_\mathbf{i}^4}\Big)\,\epsilon^2+0[\epsilon]^3\Big]$$

Out[•]=

$$
\begin{aligned}
&dS \to \mathbb{E}_{\{i\}\to\{i\}}\Big[-a_i\,\alpha_i-b_i\,\beta_i,\ -\frac{y_i\,\mathcal{A}_i\,\eta_i}{B_i}-x_i\,\mathcal{A}_i\,\xi_i+\frac{(\mathcal{A}_i-B_i\,\mathcal{A}_i)\,\eta_i\,\xi_i}{\hbar\,B_i},\\
&\quad 1+\Big(\frac{\gamma\,\hbar\,y_i\,\mathcal{A}_i\,\eta_i}{B_i}-\frac{y_i\,\mathcal{A}_i\,\beta_i\,\eta_i}{B_i}-\frac{\gamma\,\hbar\,y_i^2\,\mathcal{A}_i^2\,\eta_i^2}{2\,B_i^2}-\hbar\,a_i\,x_i\,\mathcal{A}_i\,\xi_i-x_i\,\mathcal{A}_i\,\beta_i\,\xi_i+\frac{a_i\,\mathcal{A}_i\,\eta_i\,\xi_i}{B_i}-\\
&\qquad\frac{\gamma\,\hbar\,x_i\,y_i\,\mathcal{A}_i^2\,\eta_i\,\xi_i}{B_i}+\frac{(-\gamma\,\mathcal{A}_i+\gamma\,B_i\,\mathcal{A}_i)\,\eta_i\,\xi_i}{B_i}+\frac{(\mathcal{A}_i-B_i\,\mathcal{A}_i)\,\beta_i\,\eta_i\,\xi_i}{\hbar\,B_i}+\frac{y_i\,(3\,\gamma\,\mathcal{A}_i^2-\gamma\,B_i\,\mathcal{A}_i^2)\,\eta_i^2\,\xi_i}{2\,B_i^2}-\\
&\qquad\frac{1}{2}\,\gamma\,\hbar\,x_i^2\,\mathcal{A}_i^2\,\xi_i^2+\frac{x_i\,(3\,\gamma\,\mathcal{A}_i^2-\gamma\,B_i\,\mathcal{A}_i^2)\,\eta_i\,\xi_i^2}{2\,B_i}+\frac{(-3\,\gamma\,\mathcal{A}_i^2+4\,\gamma\,B_i\,\mathcal{A}_i^2-\gamma\,B_i^2\,\mathcal{A}_i^2)\,\eta_i^2\,\xi_i^2}{4\,\hbar\,B_i^2}\Big)\,\epsilon+\\
&\qquad\Big(-\frac{\gamma^2\,\hbar^2\,y_i\,\mathcal{A}_i\,\eta_i}{2\,B_i}+\frac{\gamma\,\hbar\,y_i\,\mathcal{A}_i\,\beta_i\,\eta_i}{B_i}-\frac{y_i\,\mathcal{A}_i\,\beta_i^2\,\eta_i}{2\,B_i}+\frac{7\,\gamma^2\,\hbar^2\,y_i^2\,\mathcal{A}_i^2\,\eta_i^2}{4\,B_i^2}-\frac{2\,\gamma\,\hbar\,y_i^2\,\mathcal{A}_i^2\,\beta_i\,\eta_i^2}{B_i^2}+\frac{y_i^2\,\mathcal{A}_i^2\,\beta_i^2\,\eta_i^2}{2\,B_i^2}-\frac{\gamma^2\,\hbar^2\,y_i^3\,\mathcal{A}_i^3\,\eta_i^3}{B_i^3}+\\
&\qquad\frac{\gamma\,\hbar\,y_i^3\,\mathcal{A}_i^3\,\beta_i\,\eta_i^3}{2\,B_i^3}+\frac{\gamma^2\,\hbar^2\,y_i^4\,\mathcal{A}_i^4\,\eta_i^4}{8\,B_i^4}-\frac{1}{2}\,\hbar^2\,a_i^2\,x_i\,\mathcal{A}_i\,\xi_i-\hbar\,a_i\,x_i\,\mathcal{A}_i\,\beta_i\,\xi_i-\frac{1}{2}\,x_i\,\mathcal{A}_i\,\beta_i^2\,\xi_i-\frac{\gamma\,\hbar\,a_i\,\mathcal{A}_i\,\eta_i\,\xi_i}{B_i}+\\
&\qquad\frac{\hbar\,a_i^2\,\mathcal{A}_i\,\eta_i\,\xi_i}{2\,B_i}+\frac{3\,\gamma^2\,\hbar^2\,x_i\,y_i\,\mathcal{A}_i^2\,\eta_i\,\xi_i}{2\,B_i}-\frac{2\,\gamma\,\hbar^2\,a_i\,x_i\,y_i\,\mathcal{A}_i^2\,\eta_i\,\xi_i}{B_i}+\frac{(\gamma^2\,\hbar\,\mathcal{A}_i-\gamma^2\,\hbar\,B_i\,\mathcal{A}_i)\,\eta_i\,\xi_i}{2\,B_i}+\frac{a_i\,\mathcal{A}_i\,\beta_i\,\eta_i\,\xi_i}{B_i}-\\
&\qquad\frac{3\,\gamma\,\hbar\,x_i\,y_i\,\mathcal{A}_i^2\,\beta_i\,\eta_i\,\xi_i}{B_i}+\frac{\hbar\,a_i\,x_i\,y_i\,\mathcal{A}_i^2\,\beta_i\,\eta_i\,\xi_i}{B_i}+\frac{(-\gamma\,\mathcal{A}_i+\gamma\,B_i\,\mathcal{A}_i)\,\beta_i\,\eta_i\,\xi_i}{B_i}+\frac{x_i\,y_i\,\mathcal{A}_i^2\,\beta_i^2\,\eta_i\,\xi_i}{B_i}+\frac{(\mathcal{A}_i-B_i\,\mathcal{A}_i)\,\beta_i^2\,\eta_i\,\xi_i}{2\,\hbar\,B_i}+\\
&\qquad\frac{5\,\gamma\,\hbar\,a_i\,y_i\,\mathcal{A}_i^2\,\eta_i^2\,\xi_i}{2\,B_i^2}-\frac{5\,\gamma^2\,\hbar^2\,x_i\,y_i^2\,\mathcal{A}_i^3\,\eta_i^2\,\xi_i}{2\,B_i^2}+\frac{\gamma\,\hbar^2\,a_i\,x_i\,y_i^2\,\mathcal{A}_i^3\,\eta_i^2\,\xi_i}{2\,B_i^2}+\frac{y_i\,(-21\,\gamma^2\,\hbar\,\mathcal{A}_i^2+9\,\gamma^2\,\hbar\,B_i\,\mathcal{A}_i^2)\,\eta_i^2\,\xi_i}{4\,B_i^2}-\frac{a_i\,y_i\,\mathcal{A}_i^2\,\beta_i\,\eta_i^2\,\xi_i}{B_i^2}+\\
&\qquad\frac{3\,\gamma\,\hbar\,x_i\,y_i^2\,\mathcal{A}_i^3\,\beta_i\,\eta_i^2\,\xi_i}{2\,B_i^2}+\frac{y_i\,(5\,\gamma\,\mathcal{A}_i^2-3\,\gamma\,B_i\,\mathcal{A}_i^2)\,\beta_i\,\eta_i^2\,\xi_i}{B_i^2}+\frac{y_i\,(-\mathcal{A}_i^2+B_i\,\mathcal{A}_i^2)\,\beta_i^2\,\eta_i^2\,\xi_i}{\hbar\,B_i^2}-\frac{\gamma\,\hbar\,a_i\,y_i^2\,\mathcal{A}_i^3\,\eta_i^3\,\xi_i}{2\,B_i^3}+\frac{\gamma^2\,\hbar^2\,x_i\,y_i^3\,\mathcal{A}_i^4\,\eta_i^3\,\xi_i}{2\,B_i^3}+\\
&\qquad\frac{y_i^2\,(14\,\gamma^2\,\hbar\,\mathcal{A}_i^3-5\,\gamma^2\,\hbar\,B_i\,\mathcal{A}_i^3)\,\eta_i^3\,\xi_i}{3\,B_i^3}+\frac{y_i^2\,(-2\,\gamma\,\mathcal{A}_i^3+\gamma\,B_i\,\mathcal{A}_i^3)\,\beta_i\,\eta_i^3\,\xi_i}{B_i^3}+\frac{y_i^3\,(-3\,\gamma^2\,\hbar\,\mathcal{A}_i^4+\gamma^2\,\hbar\,B_i\,\mathcal{A}_i^4)\,\eta_i^4\,\xi_i}{4\,B_i^4}+\frac{1}{4}\,\gamma^2\,\hbar^2\,x_i^2\,\mathcal{A}_i^2\,\xi_i^2-\\
&\qquad\gamma\,\hbar^2\,a_i\,x_i^2\,\mathcal{A}_i^2\,\xi_i^2+\frac{1}{2}\,\hbar^2\,a_i^2\,x_i^2\,\mathcal{A}_i^2\,\xi_i^2-\gamma\,\hbar\,x_i^2\,\mathcal{A}_i^2\,\beta_i\,\xi_i^2+\hbar\,a_i\,x_i^2\,\mathcal{A}_i^2\,\beta_i\,\xi_i^2+\frac{1}{2}\,x_i^2\,\mathcal{A}_i^2\,\beta_i^2\,\xi_i^2-\frac{\hbar\,a_i^2\,x_i\,\mathcal{A}_i^2\,\eta_i\,\xi_i^2}{B_i}-\\
&\qquad\frac{2\,\gamma^2\,\hbar^2\,x_i^2\,y_i\,\mathcal{A}_i^3\,\eta_i\,\xi_i^2}{B_i}+\frac{\gamma\,\hbar^2\,a_i\,x_i^2\,y_i\,\mathcal{A}_i^3\,\eta_i\,\xi_i^2}{B_i}+\frac{a_i\,x_i\,(8\,\gamma\,\hbar\,\mathcal{A}_i^2-3\,\gamma\,\hbar\,B_i\,\mathcal{A}_i^2)\,\eta_i\,\xi_i^2}{2\,B_i}+\frac{x_i\,(-11\,\gamma^2\,\hbar\,\mathcal{A}_i^2+3\,\gamma^2\,\hbar\,B_i\,\mathcal{A}_i^2)\,\eta_i\,\xi_i^2}{4\,B_i}+\\
&\qquad\frac{3\,\gamma\,\hbar\,x_i^2\,y_i\,\mathcal{A}_i^3\,\beta_i\,\eta_i\,\xi_i^2}{2\,B_i}+\frac{a_i\,x_i\,(-2\,\mathcal{A}_i^2+B_i\,\mathcal{A}_i^2)\,\beta_i\,\eta_i\,\xi_i^2}{B_i}+\frac{x_i\,(4\,\gamma\,\mathcal{A}_i^2-2\,\gamma\,B_i\,\mathcal{A}_i^2)\,\beta_i\,\eta_i\,\xi_i^2}{B_i}+\frac{x_i\,(-\mathcal{A}_i^2+B_i\,\mathcal{A}_i^2)\,\beta_i^2\,\eta_i\,\xi_i^2}{\hbar\,B_i}+\\
&\qquad\frac{a_i^2\,\mathcal{A}_i^2\,\eta_i^2\,\xi_i^2}{2\,B_i^2}+\frac{3\,\gamma^2\,\hbar^2\,x_i^2\,y_i^2\,\mathcal{A}_i^4\,\eta_i^2\,\xi_i^2}{4\,B_i^2}+\frac{a_i\,(-5\,\gamma\,\mathcal{A}_i^2+4\,\gamma\,B_i\,\mathcal{A}_i^2)\,\eta_i^2\,\xi_i^2}{2\,B_i^2}+\frac{(21\,\gamma^2\,\mathcal{A}_i^2-30\,\gamma^2\,B_i\,\mathcal{A}_i^2+9\,\gamma^2\,B_i^2\,\mathcal{A}_i^2)\,\eta_i^2\,\xi_i^2}{8\,B_i^2}+\\
&\qquad\frac{a_i\,x_i\,y_i\,(-5\,\gamma\,\hbar\,\mathcal{A}_i^3+\gamma\,\hbar\,B_i\,\mathcal{A}_i^3)\,\eta_i^2\,\xi_i^2}{2\,B_i^2}+\frac{x_i\,y_i\,(31\,\gamma^2\,\hbar\,\mathcal{A}_i^3-11\,\gamma^2\,\hbar\,B_i\,\mathcal{A}_i^3)\,\eta_i^2\,\xi_i^2}{4\,B_i^2}+\frac{a_i\,(\mathcal{A}_i^2-B_i\,\mathcal{A}_i^2)\,\beta_i\,\eta_i^2\,\xi_i^2}{\hbar\,B_i^2}+\\
&\qquad\frac{(-5\,\gamma\,\mathcal{A}_i^2+8\,\gamma\,B_i\,\mathcal{A}_i^2-3\,\gamma\,B_i^2\,\mathcal{A}_i^2)\,\beta_i\,\eta_i^2\,\xi_i^2}{2\,\hbar\,B_i^2}+\frac{x_i\,y_i\,(-4\,\gamma\,\mathcal{A}_i^3+2\,\gamma\,B_i\,\mathcal{A}_i^3)\,\beta_i\,\eta_i^2\,\xi_i^2}{B_i^2}+\frac{(\mathcal{A}_i^2-2\,B_i\,\mathcal{A}_i^2+B_i^2\,\mathcal{A}_i^2)\,\beta_i^2\,\eta_i^2\,\xi_i^2}{2\,\hbar^2\,B_i^2}+\\
&\qquad\frac{a_i\,y_i\,(3\,\gamma\,\mathcal{A}_i^3-\gamma\,B_i\,\mathcal{A}_i^3)\,\eta_i^3\,\xi_i^2}{2\,B_i^3}+\frac{y_i\,(-34\,\gamma^2\,\mathcal{A}_i^3+35\,\gamma^2\,B_i\,\mathcal{A}_i^3-7\,\gamma^2\,B_i^2\,\mathcal{A}_i^3)\,\eta_i^3\,\xi_i^2}{6\,B_i^3}+\frac{x_i\,y_i^2\,(-9\,\gamma^2\,\hbar\,\mathcal{A}_i^4+3\,\gamma^2\,\hbar\,B_i\,\mathcal{A}_i^4)\,\eta_i^3\,\xi_i^2}{4\,B_i^3}+\\
&\qquad\frac{y_i\,(9\,\gamma\,\mathcal{A}_i^3-12\,\gamma\,B_i\,\mathcal{A}_i^3+3\,\gamma\,B_i^2\,\mathcal{A}_i^3)\,\beta_i\,\eta_i^3\,\xi_i^2}{4\,\hbar\,B_i^3}+\frac{y_i^2\,(6\,\gamma^2\,\mathcal{A}_i^4-5\,\gamma^2\,B_i\,\mathcal{A}_i^4+\gamma^2\,B_i^2\,\mathcal{A}_i^4)\,\eta_i^4\,\xi_i^2}{4\,B_i^4}-\frac{1}{2}\,\gamma^2\,\hbar^2\,x_i^3\,\mathcal{A}_i^3\,\xi_i^3+\\
&\qquad\frac{1}{2}\,\gamma\,\hbar^2\,a_i\,x_i^3\,\mathcal{A}_i^3\,\xi_i^3+\frac{1}{2}\,\gamma\,\hbar\,x_i^3\,\mathcal{A}_i^3\,\beta_i\,\xi_i^3+\frac{\gamma^2\,\hbar^2\,x_i^3\,y_i\,\mathcal{A}_i^4\,\eta_i\,\xi_i^3}{2\,B_i}+\frac{a_i\,x_i^2\,(-4\,\gamma\,\hbar\,\mathcal{A}_i^3+\gamma\,\hbar\,B_i\,\mathcal{A}_i^3)\,\eta_i\,\xi_i^3}{2\,B_i}+\\
&\qquad\frac{x_i^2\,(19\,\gamma^2\,\hbar\,\mathcal{A}_i^3-7\,\gamma^2\,\hbar\,B_i\,\mathcal{A}_i^3)\,\eta_i\,\xi_i^3}{6\,B_i}+\frac{x_i^2\,(-2\,\gamma\,\mathcal{A}_i^3+\gamma\,B_i\,\mathcal{A}_i^3)\,\beta_i\,\eta_i\,\xi_i^3}{B_i}+\frac{a_i\,x_i\,(9\,\gamma\,\mathcal{A}_i^3-6\,\gamma\,B_i\,\mathcal{A}_i^3+\gamma\,B_i^2\,\mathcal{A}_i^3)\,\eta_i^2\,\xi_i^3}{4\,B_i^2}+\\
&\qquad\frac{x_i\,(-59\,\gamma^2\,\mathcal{A}_i^3+58\,\gamma^2\,B_i\,\mathcal{A}_i^3-11\,\gamma^2\,B_i^2\,\mathcal{A}_i^3)\,\eta_i^2\,\xi_i^3}{12\,B_i^2}+\frac{x_i^2\,y_i\,(-9\,\gamma^2\,\hbar\,\mathcal{A}_i^4+3\,\gamma^2\,\hbar\,B_i\,\mathcal{A}_i^4)\,\eta_i^2\,\xi_i^3}{4\,B_i^2}+\frac{x_i\,(9\,\gamma\,\mathcal{A}_i^3-12\,\gamma\,B_i\,\mathcal{A}_i^3+3\,\gamma\,B_i^2\,\mathcal{A}_i^3)\,\beta_i\,\eta_i^2\,\xi_i^3}{4\,\hbar\,B_i^2}+\\
&\qquad\frac{a_i\,(-3\,\gamma\,\mathcal{A}_i^3+4\,\gamma\,B_i\,\mathcal{A}_i^3-\gamma\,B_i^2\,\mathcal{A}_i^3)\,\eta_i^3\,\xi_i^3}{4\,\hbar\,B_i^3}+\frac{(34\,\gamma^2\,\mathcal{A}_i^3-69\,\gamma^2\,B_i\,\mathcal{A}_i^3+42\,\gamma^2\,B_i^2\,\mathcal{A}_i^3-7\,\gamma^2\,B_i^3\,\mathcal{A}_i^3)\,\eta_i^3\,\xi_i^3}{18\,\hbar\,B_i^3}+\frac{x_i\,y_i\,(6\,\gamma^2\,\mathcal{A}_i^4-5\,\gamma^2\,B_i\,\mathcal{A}_i^4+\gamma^2\,B_i^2\,\mathcal{A}_i^4)\,\eta_i^3\,\xi_i^3}{2\,B_i^3}+\\
&\qquad\frac{(-3\,\gamma\,\mathcal{A}_i^3+7\,\gamma\,B_i\,\mathcal{A}_i^3-5\,\gamma\,B_i^2\,\mathcal{A}_i^3+\gamma\,B_i^3\,\mathcal{A}_i^3)\,\beta_i\,\eta_i^3\,\xi_i^3}{4\,\hbar^2\,B_i^3}+\frac{y_i\,(-9\,\gamma^2\,\mathcal{A}_i^4+15\,\gamma^2\,B_i\,\mathcal{A}_i^4-7\,\gamma^2\,B_i^2\,\mathcal{A}_i^4+\gamma^2\,B_i^3\,\mathcal{A}_i^4)\,\eta_i^4\,\xi_i^3}{8\,\hbar\,B_i^4}+\frac{1}{8}\,\gamma^2\,\hbar^2\,x_i^4\,\mathcal{A}_i^4\,\xi_i^4+\\
&\qquad\frac{x_i^3\,(-3\,\gamma^2\,\hbar\,\mathcal{A}_i^4+\gamma^2\,\hbar\,B_i\,\mathcal{A}_i^4)\,\eta_i\,\xi_i^4}{4\,B_i}+\frac{x_i^2\,(6\,\gamma^2\,\mathcal{A}_i^4-5\,\gamma^2\,B_i\,\mathcal{A}_i^4+\gamma^2\,B_i^2\,\mathcal{A}_i^4)\,\eta_i^2\,\xi_i^4}{4\,B_i^2}+\frac{x_i\,(-9\,\gamma^2\,\mathcal{A}_i^4+15\,\gamma^2\,B_i\,\mathcal{A}_i^4-7\,\gamma^2\,B_i^2\,\mathcal{A}_i^4+\gamma^2\,B_i^3\,\mathcal{A}_i^4)\,\eta_i^3\,\xi_i^4}{8\,\hbar\,B_i^3}+\\
&\qquad\frac{1}{32\,\hbar^2\,B_i^4}\left(9\,\gamma^2\,\mathcal{A}_i^4-24\,\gamma^2\,B_i\,\mathcal{A}_i^4+22\,\gamma^2\,B_i^2\,\mathcal{A}_i^4-8\,\gamma^2\,B_i^3\,\mathcal{A}_i^4+\gamma^2\,B_i^4\,\mathcal{A}_i^4\right)\eta_i^4\,\xi_i^4\Big)\,\epsilon^2+0[\epsilon]^3\Big]\\
&a\Delta \to \mathbb{E}_{\{i\}\to\{j,k\}}\Big[a_j\,\alpha_i+a_k\,\alpha_i,\ x_j\,\xi_i+x_k\,\xi_i,\\
&\quad 1+\Big(-\hbar\,a_j\,x_k\,\xi_i+\frac{1}{2}\,\gamma\,\hbar\,x_j\,x_k\,\xi_i^2\Big)\,\epsilon+\Big(\frac{1}{2}\,\hbar^2\,a_j^2\,x_k\,\xi_i+\frac{1}{4}\,\gamma^2\,\hbar^2\,x_j\,x_k\,\xi_i^2-\frac{1}{2}\,\gamma\,\hbar^2\,a_j\,x_j\,x_k\,\xi_i^2+\frac{1}{2}\,\hbar^2\,a_j^2\,x_k^2\,\xi_i^2+\\
&\qquad\frac{1}{6}\,\gamma^2\,\hbar^2\,x_j^2\,x_k\,\xi_i^3+\frac{1}{6}\,\gamma^2\,\hbar^2\,x_j\,x_k^2\,\xi_i^3-\frac{1}{2}\,\gamma\,\hbar^2\,a_j\,x_j\,x_k^2\,\xi_i^3+\frac{1}{8}\,\gamma^2\,\hbar^2\,x_j^2\,x_k^2\,\xi_i^4\Big)\,\epsilon^2+0[\epsilon]^3\Big]\\
&b\Delta \to \mathbb{E}_{\{i\}\to\{j,k\}}\Big[b_j\,\beta_i+b_k\,\beta_i,\ B_k\,y_j\,\eta_i+y_k\,\eta_i,\ 1+\frac{1}{2}\,\gamma\,\hbar\,B_k\,y_j\,y_k\,\eta_i^2\,\epsilon+\\
&\quad\Big(\frac{1}{4}\,\gamma^2\,\hbar^2\,B_k\,y_j\,y_k\,\eta_i^2+\frac{1}{6}\,\gamma^2\,\hbar^2\,B_k^2\,y_j^2\,y_k\,\eta_i^3+\frac{1}{6}\,\gamma^2\,\hbar^2\,B_k\,y_j\,y_k^2\,\eta_i^3+\frac{1}{8}\,\gamma^2\,\hbar^2\,B_k^2\,y_j^2\,y_k^2\,\eta_i^4\Big)\,\epsilon^2+0[\epsilon]^3\Big]
\end{aligned}
$$

$$d\triangle \to \mathbb{E}_{\{i\}\to\{j,k\}}\Big[a_j\,\alpha_i + a_k\,\alpha_i + b_j\,\beta_i + b_k\,\beta_i,\ y_j\,\eta_i + B_j\,y_k\,\eta_i + x_j\,\xi_i + x_k\,\xi_i,\ 1 + \Big(\frac{1}{2}\gamma\,\hbar\,B_j\,y_j\,y_k\,\eta_i^2 - \hbar\,a_j\,x_k\,\xi_i + \frac{1}{2}\gamma\,\hbar\,x_j\,x_k\,\xi_i^2\Big)\,\epsilon + \Big(\frac{1}{4}\gamma^2\,\hbar^2\,B_j\,y_j\,y_k\,\eta_i^2 + \frac{1}{6}\gamma^2\,\hbar^2\,B_j\,y_j^2\,y_k\,\eta_i^3 + \frac{1}{6}\gamma^2\,\hbar^2\,B_j^2\,y_j\,y_k^2\,\eta_i^3 + \frac{1}{8}\gamma^2\,\hbar^2\,B_j^2\,y_j^2\,y_k^2\,\eta_i^4 + \frac{1}{2}\hbar^2\,a_j^2\,x_k\,\xi_i - \frac{1}{2}\gamma\,\hbar^2\,a_j\,B_j\,x_k\,y_j\,y_k\,\eta_i^2\,\xi_i + \frac{1}{4}\gamma^2\,\hbar^2\,x_j\,x_k\,\xi_i^2 - \frac{1}{2}\gamma\,\hbar^2\,a_j\,x_j\,x_k\,\xi_i^2 + \frac{1}{2}\hbar^2\,a_j^2\,x_k^2\,\xi_i^2 + \frac{1}{4}\gamma^2\,\hbar^2\,B_j\,x_j\,x_k\,y_j\,y_k\,\eta_i^2\,\xi_i^2 + \frac{1}{6}\gamma^2\,\hbar^2\,x_j^2\,x_k\,\xi_i^3 + \frac{1}{6}\gamma^2\,\hbar^2\,x_j\,x_k^2\,\xi_i^3 - \frac{1}{2}\gamma\,\hbar^2\,a_j\,x_j\,x_k^2\,\xi_i^3 + \frac{1}{8}\gamma^2\,\hbar^2\,x_j^2\,x_k^2\,\xi_i^4\Big)\,\epsilon^2 + O[\epsilon]^3\Big]$$

$$C \to \mathbb{E}_{\{\}\to\{i\}}\Big[0,\ 0,\ \sqrt{B_i} - \frac{1}{2}\Big(\hbar\,a_i\,\sqrt{B_i}\Big)\,\epsilon + \frac{1}{8}\hbar^2\,a_i^2\,\sqrt{B_i}\,\epsilon^2 + O[\epsilon]^3\Big]$$

$$\overline{C} \to \mathbb{E}_{\{\}\to\{i\}}\Big[0,\ 0,\ \frac{1}{\sqrt{B_i}} + \frac{\hbar\,a_i\,\epsilon}{2\sqrt{B_i}} + \frac{\hbar^2\,a_i^2\,\epsilon^2}{8\sqrt{B_i}} + O[\epsilon]^3\Big]$$

$$\text{Kink} \to \mathbb{E}_{\{\}\to\{i\}}\Big[\hbar\,a_i\,b_i,\ \hbar\,x_i\,y_i,\ \frac{1}{\sqrt{B_i}} + \Big(\frac{\hbar\,a_i}{2\sqrt{B_i}} - \frac{\gamma\,\hbar^3\,x_i^2\,y_i^2}{4\sqrt{B_i}}\Big)\,\epsilon + \Big(\frac{\hbar^2\,a_i^2}{8\sqrt{B_i}} - \frac{\gamma\,\hbar^4\,a_i\,x_i^2\,y_i^2}{8\sqrt{B_i}} + \frac{\gamma^2\,\hbar^5\,x_i^3\,y_i^3}{9\sqrt{B_i}} + \frac{\gamma^2\,\hbar^6\,x_i^4\,y_i^4}{32\sqrt{B_i}}\Big)\,\epsilon^2 + O[\epsilon]^3\Big]$$

$$\overline{\text{Kink}} \to \mathbb{E}_{\{\}\to\{i\}}\Big[-\hbar\,a_i\,b_i,\ -\frac{\hbar\,x_i\,y_i}{B_i},\ \sqrt{B_i} + \Big(-\frac{1}{2}\hbar\,a_i\,\sqrt{B_i} - \frac{\hbar^2\,a_i\,x_i\,y_i}{\sqrt{B_i}} - \frac{3\,\gamma\,\hbar^3\,x_i^2\,y_i^2}{4\,B_i^{3/2}}\Big)\,\epsilon + \Big(\frac{1}{8}\hbar^2\,a_i^2\,\sqrt{B_i} + \frac{\gamma^2\,\hbar^4\,x_i^2\,y_i^2}{2\,B_i^{3/2}} - \frac{9\,\gamma\,\hbar^4\,a_i\,x_i^2\,y_i^2}{8\,B_i^{3/2}} + \frac{\hbar^4\,a_i^2\,x_i^2\,y_i^2}{2\,B_i^{3/2}} - \frac{10\,\gamma^2\,\hbar^5\,x_i^3\,y_i^3}{9\,B_i^{5/2}} + \frac{3\,\gamma\,\hbar^5\,a_i\,x_i^3\,y_i^3}{4\,B_i^{5/2}} + \frac{9\,\gamma^2\,\hbar^6\,x_i^4\,y_i^4}{32\,B_i^{7/2}}\Big)\,\epsilon^2 + O[\epsilon]^3\Big]$$

$$b2t \to \mathbb{E}_{\{i\}\to\{i\}}\Big[a_i\,\alpha_i - \frac{t_i\,\beta_i}{\gamma},\ y_i\,\eta_i + x_i\,\xi_i,\ 1 + \frac{a_i\,\beta_i\,\epsilon}{\gamma} + \frac{a_i^2\,\beta_i^2\,\epsilon^2}{2\,\gamma^2} + O[\epsilon]^3\Big]$$

$$t2b \to \mathbb{E}_{\{i\}\to\{i\}}\Big[a_i\,\alpha_i - \gamma\,b_i\,\tau_i,\ y_i\,\eta_i + x_i\,\xi_i,\ 1 + a_i\,\tau_i\,\epsilon + \frac{1}{2}a_i^2\,\tau_i^2\,\epsilon^2 + O[\epsilon]^3\Big]$$

In[•]:=
```
Print[degrule = Thread[{a, b, α, β, ξ, η, x, y, ħ, γ, ϵ, t, τ, T, B, 𝒜} →
      {1, 1, -1, -1, -1, -1, 1, 1, -2, 1, 1, 2, -2, 0, 0, 0}]];
atoms /. 𝔼sp__[L_, Q_, P_] :> (𝔼[L, Q, P] ≡
    (𝔼[L, Q, Normal@P] /. {v_i_ :> s^v/.degrule v_i, (v : ħ | ϵ | γ) :> s^v/.degrule v}))
```

$$\{a \to 1,\ b \to 1,\ \alpha \to -1,\ \beta \to -1,\ \xi \to -1,\ \eta \to -1,\ x \to 1,\ y \to 1,\ \hbar \to -2,\ \gamma \to 1,\ \epsilon \to 1,\ t \to 2,\ \tau \to -2,\ T \to 0,\ B \to 0,\ \mathcal{A} \to 0\}$$

Out[•]=
$$\{am \to \text{True},\ bm \to \text{True},\ dm \to \text{True},\ R \to \text{True},\ \overline{R} \to \text{True},\ P \to \text{True},\ aS \to \text{True},\ \overline{aS} \to \text{True},\ bS \to \text{True},\ \overline{bS} \to \text{True},\ dS \to \text{True},\ a\triangle \to \text{True},\ b\triangle \to \text{True},\ d\triangle \to \text{True},\ C \to \text{True},\ \overline{C} \to \text{True},\ \text{Kink} \to \text{True},\ \overline{\text{Kink}} \to \text{True},\ b2t \to \text{True},\ t2b \to \text{True}\}$$

In[•]:=
```
Print[degrule = Thread[{a, b, α, β, ξ, η, x, y, ħ, γ, ϵ, t, τ, T, B, 𝒜} →
      {0, 1, 0, -1, 0, -1, 0, 1, -1, 0, 1, 1, -1, 0, 0, 0}]];
atoms /. 𝔼sp__[L_, Q_, P_] :> (𝔼[L, Q, P] ≡
    (𝔼[L, Q, Normal@P] /. {v_i_ :> s^v/.degrule v_i, (v : ħ | ϵ | γ) :> s^v/.degrule v}))
```

$$\{a \to 0,\ b \to 1,\ \alpha \to 0,\ \beta \to -1,\ \xi \to 0,\ \eta \to -1,\ x \to 0,\ y \to 1,\ \hbar \to -1,\ \gamma \to 0,\ \epsilon \to 1,\ t \to 1,\ \tau \to -1,\ T \to 0,\ B \to 0,\ \mathcal{A} \to 0\}$$

Out[•]=
$$\{am \to \text{True},\ bm \to \text{True},\ dm \to \text{True},\ R \to \text{True},\ \overline{R} \to \text{True},\ P \to \text{True},\ aS \to \text{True},\ \overline{aS} \to \text{True},\ bS \to \text{True},\ \overline{bS} \to \text{True},\ dS \to \text{True},\ a\triangle \to \text{True},\ b\triangle \to \text{True},\ d\triangle \to \text{True},\ C \to \text{True},\ \overline{C} \to \text{True},\ \text{Kink} \to \text{True},\ \overline{\text{Kink}} \to \text{True},\ b2t \to \text{True},\ t2b \to \text{True}\}$$

In[•]:=
```
Print[degrule = Thread[{a, b, α, β, ξ, η, x, y, ħ, γ, ϵ, t, τ, T, B, 𝒜} →
      {1, 0, -1, 0, -1, 0, 1, 0, -1, 1, 0, 1, -1, 0, 0, 0}]];
atoms /. 𝔼sp__[L_, Q_, P_] :> (𝔼[L, Q, P] ≡
    (𝔼[L, Q, Normal@P] /. {v_i_ :> s^v/.degrule v_i, (v : ħ | ϵ | γ) :> s^v/.degrule v}))
```

$\{a \to 1, b \to 0, \alpha \to -1, \beta \to 0, \xi \to -1, \eta \to 0, x \to 1,$
$y \to 0, \hbar \to -1, \gamma \to 1, \epsilon \to 0, t \to 1, \tau \to -1, T \to 0, B \to 0, \mathcal{A} \to 0\}$

Out[•]=
$\{am \to \text{True}, bm \to \text{True}, dm \to \text{True}, R \to \text{True}, \overline{R} \to \text{True}, P \to \text{True}, aS \to \text{True},$
$\overline{aS} \to \text{True}, bS \to \text{True}, \overline{bS} \to \text{True}, dS \to \text{True}, a\triangle \to \text{True}, b\triangle \to \text{True}, d\triangle \to \text{True},$
$C \to \text{True}, \overline{C} \to \text{True}, \text{Kink} \to \text{True}, \overline{\text{Kink}} \to \text{True}, b2t \to \text{True}, t2b \to \text{True}\}$

In[•]:=
```
Column[atoms /. 𝔼sp__[L_, Q_, P_] :> 𝔼𝔼sp[L, Q, CF@Log[P]]]
```

$$am \to \mathbb{EE}_{\{i,j\}\to\{k\}}\left[a_k\ (\alpha_i+\alpha_j),\ x_k\ \left(e^{-\gamma\,\alpha_j}\ \xi_i+\xi_j\right),\ 0\right]$$

$$bm \to \mathbb{EE}_{\{i,j\}\to\{k\}}\left[b_k\ (\beta_i+\beta_j),\ y_k\ (\eta_i+\eta_j),\ -y_k\,\beta_i\,\eta_j\,\epsilon+\frac{1}{2}\,y_k\,\beta_i^2\,\eta_j\,\epsilon^2+O[\epsilon]^3\right]$$

$$dm \to \mathbb{EE}_{\{i,j\}\to\{k\}}\left[a_k\,\alpha_i+a_k\,\alpha_j+b_k\,\beta_i+b_k\,\beta_j,\ y_k\,\eta_i+\frac{y_k\,\eta_j}{\mathcal{A}_i}+\frac{x_k\,\xi_i}{\mathcal{A}_j}+\frac{(1-B_k)\,\eta_j\,\xi_i}{\hbar}+x_k\,\xi_j,\right.$$
$$\left(-\frac{y_k\,\beta_i\,\eta_j}{\mathcal{A}_i}-\frac{x_k\,\beta_j\,\xi_i}{\mathcal{A}_j}+a_k\,B_k\,\eta_j\,\xi_i+\frac{\gamma\,\hbar\,x_k\,y_k\,\eta_j\,\xi_i}{\mathcal{A}_i\,\mathcal{A}_j}+\frac{(\gamma-3\,\gamma\,B_k)\,y_k\,\eta_j^2\,\xi_i}{2\,\mathcal{A}_i}+\frac{(\gamma-3\,\gamma\,B_k)\,x_k\,\eta_j\,\xi_i^2}{2\,\mathcal{A}_j}+\frac{(\gamma-4\,\gamma\,B_k+3\,\gamma\,B_k^2)\,\eta_j^2\,\xi_i^2}{4\,\hbar}\right)\epsilon+$$
$$\left(\frac{y_k\,\beta_i^2\,\eta_j}{2\,\mathcal{A}_i}+\frac{x_k\,\beta_j^2\,\xi_i}{2\,\mathcal{A}_j}-\frac{1}{2}\,\hbar\,a_k^2\,B_k\,\eta_j\,\xi_i+\frac{\gamma^2\,\hbar^2\,x_k\,y_k\,\eta_j\,\xi_i}{2\,\mathcal{A}_i\,\mathcal{A}_j}-\frac{\gamma\,\hbar\,x_k\,y_k\,\beta_i\,\eta_j\,\xi_i}{\mathcal{A}_i\,\mathcal{A}_j}-\frac{\gamma\,\hbar\,x_k\,y_k\,\beta_j\,\eta_j\,\xi_i}{\mathcal{A}_i\,\mathcal{A}_j}+\frac{3\,\gamma\,\hbar\,a_k\,B_k\,y_k\,\eta_j^2\,\xi_i}{2\,\mathcal{A}_i}+\right.$$
$$\frac{(\gamma^2\,\hbar-5\,\gamma^2\,\hbar\,B_k)\,y_k\,\eta_j^2\,\xi_i}{4\,\mathcal{A}_i}+\frac{\gamma^2\,\hbar^2\,x_k\,y_k^2\,\eta_j^2\,\xi_i}{2\,\mathcal{A}_i^2\,\mathcal{A}_j}+\frac{(-\gamma+3\,\gamma\,B_k)\,y_k\,\beta_i\,\eta_j^2\,\xi_i}{2\,\mathcal{A}_i}+\frac{(\gamma^2\,\hbar-7\,\gamma^2\,\hbar\,B_k)\,y_k^2\,\eta_j^3\,\xi_i}{6\,\mathcal{A}_i^2}+\frac{\gamma^2\,\hbar^2\,x_k^2\,y_k\,\eta_j\,\xi_i^2}{2\,\mathcal{A}_i\,\mathcal{A}_j^2}+$$
$$\frac{3\,\gamma\,\hbar\,a_k\,B_k\,x_k\,\eta_j\,\xi_i^2}{2\,\mathcal{A}_j}+\frac{(\gamma^2\,\hbar-5\,\gamma^2\,\hbar\,B_k)\,x_k\,\eta_j\,\xi_i^2}{4\,\mathcal{A}_j}+\frac{(-\gamma+3\,\gamma\,B_k)\,x_k\,\beta_j\,\eta_j\,\xi_i^2}{2\,\mathcal{A}_j}+\frac{1}{2}\,a_k\,\left(2\,\gamma\,B_k-3\,\gamma\,B_k^2\right)\,\eta_j^2\,\xi_i^2+$$
$$\frac{1}{8}\,\left(\gamma^2-6\,\gamma^2\,B_k+5\,\gamma^2\,B_k^2\right)\,\eta_j^2\,\xi_i^2+\frac{(5\,\gamma^2\,\hbar-21\,\gamma^2\,\hbar\,B_k)\,x_k\,y_k\,\eta_j^2\,\xi_i^2}{4\,\mathcal{A}_i\,\mathcal{A}_j}+\frac{(5\,\gamma^2-34\,\gamma^2\,B_k+41\,\gamma^2\,B_k^2)\,y_k\,\eta_j^3\,\xi_i^2}{12\,\mathcal{A}_i}+$$
$$\left.\left.\frac{(\gamma^2\,\hbar-7\,\gamma^2\,\hbar\,B_k)\,x_k^2\,\eta_j\,\xi_i^3}{6\,\mathcal{A}_j^2}+\frac{(5\,\gamma^2-34\,\gamma^2\,B_k+41\,\gamma^2\,B_k^2)\,x_k\,\eta_j^2\,\xi_i^3}{12\,\mathcal{A}_j}+\frac{(5\,\gamma^2-39\,\gamma^2\,B_k+75\,\gamma^2\,B_k^2-41\,\gamma^2\,B_k^3)\,\eta_j^3\,\xi_i^3}{36\,\hbar}\right)\epsilon^2+O[\epsilon]^3\right]$$

$$R \to \mathbb{EE}_{\{\}\to\{i,j\}}\left[\hbar\,a_j\,b_i,\ \hbar\,x_j\,y_i,\ -\frac{1}{4}\,\left(\gamma\,\hbar^3\,x_j^2\,y_i^2\right)\epsilon+\frac{1}{9}\,\gamma^2\,\hbar^5\,x_j^3\,y_i^3\,\epsilon^2+O[\epsilon]^3\right]$$

$$\overline{R} \to \mathbb{EE}_{\{\}\to\{i,j\}}\left[-\hbar\,a_j\,b_i,\ -\frac{\hbar\,x_j\,y_i}{B_i},\right.$$
$$\left.\left(-\frac{\hbar^2\,a_j\,x_j\,y_i}{B_i}-\frac{3\,\gamma\,\hbar^3\,x_j^2\,y_i^2}{4\,B_i^2}\right)\epsilon+\left(-\frac{\hbar^3\,a_j^2\,x_j\,y_i}{2\,B_i^2}+\frac{\gamma^2\,\hbar^4\,x_j^2\,y_i^2}{2\,B_i^2}-\frac{3\,\gamma\,\hbar^4\,a_j\,x_j^2\,y_i^2}{2\,B_i^2}-\frac{10\,\gamma^2\,\hbar^5\,x_j^3\,y_i^3}{9\,B_i^3}\right)\epsilon^2+O[\epsilon]^3\right]$$

$$P \to \mathbb{EE}_{\{i,j\}\to\{\}}\left[\frac{\alpha_j\,\beta_i}{\hbar},\ \frac{\eta_i\,\xi_j}{\hbar},\ \frac{\gamma\,\eta_i^2\,\xi_j^2\,\epsilon}{4\,\hbar}+\left(\frac{1}{8}\,\gamma^2\,\eta_i^2\,\xi_j^2+\frac{5\,\gamma^2\,\eta_i^3\,\xi_j^3}{36\,\hbar}\right)\epsilon^2+O[\epsilon]^3\right]$$

$$aS \to \mathbb{EE}_{\{i\}\to\{i\}}\left[-a_i\,\alpha_i,\ -x_i\,\mathcal{A}_i\,\xi_i,\ \left(-\hbar\,a_i\,x_i\,\mathcal{A}_i\,\xi_i-\frac{1}{2}\,\gamma\,\hbar\,x_i^2\,\mathcal{A}_i^2\,\xi_i^2\right)\epsilon+\right.$$
$$\left.\left(-\frac{1}{2}\,\hbar^2\,a_i^2\,x_i\,\mathcal{A}_i\,\xi_i+\frac{1}{4}\,\gamma^2\,\hbar^2\,x_i^2\,\mathcal{A}_i^2\,\xi_i^2-\gamma\,\hbar^2\,a_i\,x_i^2\,\mathcal{A}_i^2\,\xi_i^2-\frac{1}{2}\,\gamma^2\,\hbar^2\,x_i^3\,\mathcal{A}_i^3\,\xi_i^3\right)\epsilon^2+O[\epsilon]^3\right]$$

$$\overline{aS} \to \mathbb{EE}_{\{i\}\to\{i\}}\left[-a_i\,\alpha_i,\ -x_i\,\mathcal{A}_i\,\xi_i,\right.$$
$$\left(\gamma\,\hbar\,x_i\,\mathcal{A}_i\,\xi_i-\hbar\,a_i\,x_i\,\mathcal{A}_i\,\xi_i-\frac{1}{2}\,\gamma\,\hbar\,x_i^2\,\mathcal{A}_i^2\,\xi_i^2\right)\epsilon+\left(-\frac{1}{2}\,\gamma^2\,\hbar^2\,x_i\,\mathcal{A}_i\,\xi_i+\gamma\,\hbar^2\,a_i\,x_i\,\mathcal{A}_i\,\xi_i-\right.$$
$$\left.\left.\frac{1}{2}\,\hbar^2\,a_i^2\,x_i\,\mathcal{A}_i\,\xi_i+\frac{5}{4}\,\gamma^2\,\hbar^2\,x_i^2\,\mathcal{A}_i^2\,\xi_i^2-\gamma\,\hbar^2\,a_i\,x_i^2\,\mathcal{A}_i^2\,\xi_i^2-\frac{1}{2}\,\gamma^2\,\hbar^2\,x_i^3\,\mathcal{A}_i^3\,\xi_i^3\right)\epsilon^2+O[\epsilon]^3\right]$$

$$bS \to$$
$$\mathbb{EE}_{\{i\}\to\{i\}}\left[-b_i\,\beta_i,\ -\frac{y_i\,\eta_i}{B_i},\ \left(-\frac{y_i\,\beta_i\,\eta_i}{B_i}-\frac{\gamma\,\hbar\,y_i^2\,\eta_i^2}{2\,B_i^2}\right)\epsilon+\left(-\frac{y_i\,\beta_i^2\,\eta_i}{2\,B_i}+\frac{\gamma^2\,\hbar^2\,y_i^2\,\eta_i^2}{4\,B_i^2}-\frac{\gamma\,\hbar\,y_i^2\,\beta_i\,\eta_i^2}{B_i^2}-\frac{\gamma^2\,\hbar^2\,y_i^3\,\eta_i^3}{2\,B_i^3}\right)\epsilon^2+O[\epsilon]^3\right]$$

$$\overline{bS} \to \mathbb{EE}_{\{i\}\to\{i\}}\left[-b_i\,\beta_i,\ -\frac{y_i\,\eta_i}{B_i},\ \left(\frac{\gamma\,\hbar\,y_i\,\eta_i}{B_i}-\frac{y_i\,\beta_i\,\eta_i}{B_i}-\frac{\gamma\,\hbar\,y_i^2\,\eta_i^2}{2\,B_i^2}\right)\epsilon+\right.$$
$$\left.\left(-\frac{\gamma^2\,\hbar^2\,y_i\,\eta_i}{2\,B_i}+\frac{\gamma\,\hbar\,y_i\,\beta_i\,\eta_i}{B_i}-\frac{y_i\,\beta_i^2\,\eta_i}{2\,B_i}+\frac{5\,\gamma^2\,\hbar^2\,y_i^2\,\eta_i^2}{4\,B_i^2}-\frac{\gamma\,\hbar\,y_i^2\,\beta_i\,\eta_i^2}{B_i^2}-\frac{\gamma^2\,\hbar^2\,y_i^3\,\eta_i^3}{2\,B_i^3}\right)\epsilon^2+O[\epsilon]^3\right]$$

Out[•]=

$$\mathrm{dS}\to\mathbb{EE}_{\{\mathbf{i}\}\to\{\mathbf{i}\}}\Big[-\mathsf{a}_\mathbf{i}\,\alpha_\mathbf{i}-\mathsf{b}_\mathbf{i}\,\beta_\mathbf{i},\ -\frac{\mathsf{y}_\mathbf{i}\,\mathcal{A}_\mathbf{i}\,\eta_\mathbf{i}}{\mathsf{B}_\mathbf{i}}-\mathsf{x}_\mathbf{i}\,\mathcal{A}_\mathbf{i}\,\xi_\mathbf{i}+\frac{(\mathcal{A}_\mathbf{i}-\mathsf{B}_\mathbf{i}\,\mathcal{A}_\mathbf{i})\,\eta_\mathbf{i}\,\xi_\mathbf{i}}{\hbar\,\mathsf{B}_\mathbf{i}},$$
$$\Big(\frac{\gamma\,\hbar\,\mathsf{y}_\mathbf{i}\,\mathcal{A}_\mathbf{i}\,\eta_\mathbf{i}}{\mathsf{B}_\mathbf{i}}-\frac{\mathsf{y}_\mathbf{i}\,\mathcal{A}_\mathbf{i}\,\beta_\mathbf{i}\,\eta_\mathbf{i}}{\mathsf{B}_\mathbf{i}}-\frac{\gamma\,\hbar\,\mathsf{y}_\mathbf{i}^2\,\mathcal{A}_\mathbf{i}^2\,\eta_\mathbf{i}^2}{2\,\mathsf{B}_\mathbf{i}^2}-\hbar\,\mathsf{a}_\mathbf{i}\,\mathsf{x}_\mathbf{i}\,\mathcal{A}_\mathbf{i}\,\xi_\mathbf{i}-\mathsf{x}_\mathbf{i}\,\mathcal{A}_\mathbf{i}\,\beta_\mathbf{i}\,\xi_\mathbf{i}+\frac{\mathsf{a}_\mathbf{i}\,\mathcal{A}_\mathbf{i}\,\eta_\mathbf{i}\,\xi_\mathbf{i}}{\mathsf{B}_\mathbf{i}}-$$
$$\frac{\gamma\,\hbar\,\mathsf{x}_\mathbf{i}\,\mathsf{y}_\mathbf{i}\,\mathcal{A}_\mathbf{i}^2\,\eta_\mathbf{i}\,\xi_\mathbf{i}}{\mathsf{B}_\mathbf{i}}+\frac{(-\gamma\,\mathcal{A}_\mathbf{i}+\gamma\,\mathsf{B}_\mathbf{i}\,\mathcal{A}_\mathbf{i})\,\eta_\mathbf{i}\,\xi_\mathbf{i}}{\mathsf{B}_\mathbf{i}}+\frac{(\mathcal{A}_\mathbf{i}-\mathsf{B}_\mathbf{i}\,\mathcal{A}_\mathbf{i})\,\beta_\mathbf{i}\,\eta_\mathbf{i}\,\xi_\mathbf{i}}{\hbar\,\mathsf{B}_\mathbf{i}}+\frac{\mathsf{y}_\mathbf{i}\,\left(3\,\gamma\,\mathcal{A}_\mathbf{i}^2-\gamma\,\mathsf{B}_\mathbf{i}\,\mathcal{A}_\mathbf{i}^2\right)\,\eta_\mathbf{i}^2\,\xi_\mathbf{i}}{2\,\mathsf{B}_\mathbf{i}^2}-$$
$$\frac{1}{2}\,\gamma\,\hbar\,\mathsf{x}_\mathbf{i}^2\,\mathcal{A}_\mathbf{i}^2\,\xi_\mathbf{i}^2+\frac{\mathsf{x}_\mathbf{i}\,\left(3\,\gamma\,\mathcal{A}_\mathbf{i}^2-\gamma\,\mathsf{B}_\mathbf{i}\,\mathcal{A}_\mathbf{i}^2\right)\,\eta_\mathbf{i}\,\xi_\mathbf{i}^2}{2\,\mathsf{B}_\mathbf{i}}+\frac{\left(-3\,\gamma\,\mathcal{A}_\mathbf{i}^2+4\,\gamma\,\mathsf{B}_\mathbf{i}\,\mathcal{A}_\mathbf{i}^2-\gamma\,\mathsf{B}_\mathbf{i}^2\,\mathcal{A}_\mathbf{i}^2\right)\,\eta_\mathbf{i}^2\,\xi_\mathbf{i}^2}{4\,\hbar\,\mathsf{B}_\mathbf{i}^2}\Big)\,\epsilon+$$
$$\Big(-\frac{\gamma^2\,\hbar^2\,\mathsf{y}_\mathbf{i}\,\mathcal{A}_\mathbf{i}\,\eta_\mathbf{i}}{2\,\mathsf{B}_\mathbf{i}}+\frac{\gamma\,\hbar\,\mathsf{y}_\mathbf{i}\,\mathcal{A}_\mathbf{i}\,\beta_\mathbf{i}\,\eta_\mathbf{i}}{\mathsf{B}_\mathbf{i}}-\frac{\mathsf{y}_\mathbf{i}\,\mathcal{A}_\mathbf{i}\,\beta_\mathbf{i}^2\,\eta_\mathbf{i}}{2\,\mathsf{B}_\mathbf{i}}+\frac{5\,\gamma^2\,\hbar^2\,\mathsf{y}_\mathbf{i}^2\,\mathcal{A}_\mathbf{i}^2\,\eta_\mathbf{i}^2}{4\,\mathsf{B}_\mathbf{i}^2}-\frac{\gamma\,\hbar\,\mathsf{y}_\mathbf{i}^2\,\mathcal{A}_\mathbf{i}^2\,\beta_\mathbf{i}\,\eta_\mathbf{i}^2}{\mathsf{B}_\mathbf{i}^2}-\frac{\gamma^2\,\hbar^2\,\mathsf{y}_\mathbf{i}^3\,\mathcal{A}_\mathbf{i}^3\,\eta_\mathbf{i}^3}{2\,\mathsf{B}_\mathbf{i}^3}-\frac{1}{2}\,\hbar^2\,\mathsf{a}_\mathbf{i}^2\,\mathsf{x}_\mathbf{i}\,\mathcal{A}_\mathbf{i}\,\xi_\mathbf{i}-$$
$$\hbar\,\mathsf{a}_\mathbf{i}\,\mathsf{x}_\mathbf{i}\,\mathcal{A}_\mathbf{i}\,\beta_\mathbf{i}\,\xi_\mathbf{i}-\frac{1}{2}\,\mathsf{x}_\mathbf{i}\,\mathcal{A}_\mathbf{i}\,\beta_\mathbf{i}^2\,\xi_\mathbf{i}-\frac{\gamma\,\hbar\,\mathsf{a}_\mathbf{i}\,\mathcal{A}_\mathbf{i}\,\eta_\mathbf{i}\,\xi_\mathbf{i}}{\mathsf{B}_\mathbf{i}}+\frac{\hbar\,\mathsf{a}_\mathbf{i}^2\,\mathcal{A}_\mathbf{i}\,\eta_\mathbf{i}\,\xi_\mathbf{i}}{2\,\mathsf{B}_\mathbf{i}}+\frac{3\,\gamma^2\,\hbar^2\,\mathsf{x}_\mathbf{i}\,\mathsf{y}_\mathbf{i}\,\mathcal{A}_\mathbf{i}^2\,\eta_\mathbf{i}\,\xi_\mathbf{i}}{2\,\mathsf{B}_\mathbf{i}}-\frac{\gamma\,\hbar^2\,\mathsf{a}_\mathbf{i}\,\mathsf{x}_\mathbf{i}\,\mathsf{y}_\mathbf{i}\,\mathcal{A}_\mathbf{i}^2\,\eta_\mathbf{i}\,\xi_\mathbf{i}}{\mathsf{B}_\mathbf{i}}+$$
$$\frac{\left(\gamma^2\,\hbar\,\mathcal{A}_\mathbf{i}-\gamma^2\,\hbar\,\mathsf{B}_\mathbf{i}\,\mathcal{A}_\mathbf{i}\right)\,\eta_\mathbf{i}\,\xi_\mathbf{i}}{2\,\mathsf{B}_\mathbf{i}}+\frac{\mathsf{a}_\mathbf{i}\,\mathcal{A}_\mathbf{i}\,\beta_\mathbf{i}\,\eta_\mathbf{i}\,\xi_\mathbf{i}}{\mathsf{B}_\mathbf{i}}-\frac{2\,\gamma\,\hbar\,\mathsf{x}_\mathbf{i}\,\mathsf{y}_\mathbf{i}\,\mathcal{A}_\mathbf{i}^2\,\beta_\mathbf{i}\,\eta_\mathbf{i}\,\xi_\mathbf{i}}{\mathsf{B}_\mathbf{i}}+\frac{(-\gamma\,\mathcal{A}_\mathbf{i}+\gamma\,\mathsf{B}_\mathbf{i}\,\mathcal{A}_\mathbf{i})\,\beta_\mathbf{i}\,\eta_\mathbf{i}\,\xi_\mathbf{i}}{\mathsf{B}_\mathbf{i}}+\frac{(\mathcal{A}_\mathbf{i}-\mathsf{B}_\mathbf{i}\,\mathcal{A}_\mathbf{i})\,\beta_\mathbf{i}^2\,\eta_\mathbf{i}\,\xi_\mathbf{i}}{2\,\hbar\,\mathsf{B}_\mathbf{i}}+$$
$$\frac{3\,\gamma\,\hbar\,\mathsf{a}_\mathbf{i}\,\mathsf{y}_\mathbf{i}\,\mathcal{A}_\mathbf{i}^2\,\eta_\mathbf{i}^2\,\xi_\mathbf{i}}{2\,\mathsf{B}_\mathbf{i}^2}-\frac{3\,\gamma^2\,\hbar^2\,\mathsf{x}_\mathbf{i}\,\mathsf{y}_\mathbf{i}^2\,\mathcal{A}_\mathbf{i}^3\,\eta_\mathbf{i}^2\,\xi_\mathbf{i}}{2\,\mathsf{B}_\mathbf{i}^2}+\frac{\mathsf{y}_\mathbf{i}\,\left(-17\,\gamma^2\,\hbar\,\mathcal{A}_\mathbf{i}^2+5\,\gamma^2\,\hbar\,\mathsf{B}_\mathbf{i}\,\mathcal{A}_\mathbf{i}^2\right)\,\eta_\mathbf{i}^2\,\xi_\mathbf{i}}{4\,\mathsf{B}_\mathbf{i}^2}+\frac{\mathsf{y}_\mathbf{i}\,\left(3\,\gamma\,\mathcal{A}_\mathbf{i}^2-\gamma\,\mathsf{B}_\mathbf{i}\,\mathcal{A}_\mathbf{i}^2\right)\,\beta_\mathbf{i}\,\eta_\mathbf{i}^2\,\xi_\mathbf{i}}{\mathsf{B}_\mathbf{i}^2}+$$
$$\frac{\mathsf{y}_\mathbf{i}^2\,\left(8\,\gamma^2\,\hbar\,\mathcal{A}_\mathbf{i}^3-2\,\gamma^2\,\hbar\,\mathsf{B}_\mathbf{i}\,\mathcal{A}_\mathbf{i}^3\right)\,\eta_\mathbf{i}^3\,\xi_\mathbf{i}}{3\,\mathsf{B}_\mathbf{i}^3}+\frac{1}{4}\,\gamma^2\,\hbar^2\,\mathsf{x}_\mathbf{i}^2\,\mathcal{A}_\mathbf{i}^2\,\xi_\mathbf{i}^2-\gamma\,\hbar^2\,\mathsf{a}_\mathbf{i}\,\mathsf{x}_\mathbf{i}^2\,\mathcal{A}_\mathbf{i}^2\,\xi_\mathbf{i}^2-\gamma\,\hbar\,\mathsf{x}_\mathbf{i}^2\,\mathcal{A}_\mathbf{i}^2\,\beta_\mathbf{i}\,\xi_\mathbf{i}^2-\frac{3\,\gamma^2\,\hbar^2\,\mathsf{x}_\mathbf{i}^2\,\mathsf{y}_\mathbf{i}\,\mathcal{A}_\mathbf{i}^3\,\eta_\mathbf{i}\,\xi_\mathbf{i}^2}{2\,\mathsf{B}_\mathbf{i}}+$$
$$\frac{\mathsf{a}_\mathbf{i}\,\mathsf{x}_\mathbf{i}\,\left(6\,\gamma\,\hbar\,\mathcal{A}_\mathbf{i}^2-\gamma\,\hbar\,\mathsf{B}_\mathbf{i}\,\mathcal{A}_\mathbf{i}^2\right)\,\eta_\mathbf{i}\,\xi_\mathbf{i}^2}{2\,\mathsf{B}_\mathbf{i}}+\frac{\mathsf{x}_\mathbf{i}\,\left(-11\,\gamma^2\,\hbar\,\mathcal{A}_\mathbf{i}^2+3\,\gamma^2\,\hbar\,\mathsf{B}_\mathbf{i}\,\mathcal{A}_\mathbf{i}^2\right)\,\eta_\mathbf{i}\,\xi_\mathbf{i}^2}{4\,\mathsf{B}_\mathbf{i}}+\frac{\mathsf{x}_\mathbf{i}\,\left(3\,\gamma\,\mathcal{A}_\mathbf{i}^2-\gamma\,\mathsf{B}_\mathbf{i}\,\mathcal{A}_\mathbf{i}^2\right)\,\beta_\mathbf{i}\,\eta_\mathbf{i}\,\xi_\mathbf{i}^2}{\mathsf{B}_\mathbf{i}}+\frac{\mathsf{a}_\mathbf{i}\,\left(-3\,\gamma\,\mathcal{A}_\mathbf{i}^2+2\,\gamma\,\mathsf{B}_\mathbf{i}\,\mathcal{A}_\mathbf{i}^2\right)\,\eta_\mathbf{i}^2\,\xi_\mathbf{i}^2}{2\,\mathsf{B}_\mathbf{i}^2}+$$
$$\frac{\left(17\,\gamma^2\,\mathcal{A}_\mathbf{i}^2-22\,\gamma^2\,\mathsf{B}_\mathbf{i}\,\mathcal{A}_\mathbf{i}^2+5\,\gamma^2\,\mathsf{B}_\mathbf{i}^2\,\mathcal{A}_\mathbf{i}^2\right)\,\eta_\mathbf{i}^2\,\xi_\mathbf{i}^2}{8\,\mathsf{B}_\mathbf{i}^2}+\frac{\mathsf{x}_\mathbf{i}\,\mathsf{y}_\mathbf{i}\,\left(21\,\gamma^2\,\hbar\,\mathcal{A}_\mathbf{i}^3-5\,\gamma^2\,\hbar\,\mathsf{B}_\mathbf{i}\,\mathcal{A}_\mathbf{i}^3\right)\,\eta_\mathbf{i}^2\,\xi_\mathbf{i}^2}{4\,\mathsf{B}_\mathbf{i}^2}+\frac{\left(-3\,\gamma\,\mathcal{A}_\mathbf{i}^2+4\,\gamma\,\mathsf{B}_\mathbf{i}\,\mathcal{A}_\mathbf{i}^2-\gamma\,\mathsf{B}_\mathbf{i}^2\,\mathcal{A}_\mathbf{i}^2\right)\,\beta_\mathbf{i}\,\eta_\mathbf{i}^2\,\xi_\mathbf{i}^2}{2\,\hbar\,\mathsf{B}_\mathbf{i}^2}+$$
$$\frac{\mathsf{y}_\mathbf{i}\,\left(-41\,\gamma^2\,\mathcal{A}_\mathbf{i}^3+34\,\gamma^2\,\mathsf{B}_\mathbf{i}\,\mathcal{A}_\mathbf{i}^3-5\,\gamma^2\,\mathsf{B}_\mathbf{i}^2\,\mathcal{A}_\mathbf{i}^3\right)\,\eta_\mathbf{i}^3\,\xi_\mathbf{i}^2}{12\,\mathsf{B}_\mathbf{i}^3}-\frac{1}{2}\,\gamma^2\,\hbar^2\,\mathsf{x}_\mathbf{i}^3\,\mathcal{A}_\mathbf{i}^3\,\xi_\mathbf{i}^3+\frac{\mathsf{x}_\mathbf{i}^2\,\left(8\,\gamma^2\,\hbar\,\mathcal{A}_\mathbf{i}^3-2\,\gamma^2\,\hbar\,\mathsf{B}_\mathbf{i}\,\mathcal{A}_\mathbf{i}^3\right)\,\eta_\mathbf{i}\,\xi_\mathbf{i}^3}{3\,\mathsf{B}_\mathbf{i}}+$$
$$\frac{\mathsf{x}_\mathbf{i}\,\left(-41\,\gamma^2\,\mathcal{A}_\mathbf{i}^3+34\,\gamma^2\,\mathsf{B}_\mathbf{i}\,\mathcal{A}_\mathbf{i}^3-5\,\gamma^2\,\mathsf{B}_\mathbf{i}^2\,\mathcal{A}_\mathbf{i}^3\right)\,\eta_\mathbf{i}^2\,\xi_\mathbf{i}^3}{12\,\mathsf{B}_\mathbf{i}^2}+\frac{\left(41\,\gamma^2\,\mathcal{A}_\mathbf{i}^3-75\,\gamma^2\,\mathsf{B}_\mathbf{i}\,\mathcal{A}_\mathbf{i}^3+39\,\gamma^2\,\mathsf{B}_\mathbf{i}^2\,\mathcal{A}_\mathbf{i}^3-5\,\gamma^2\,\mathsf{B}_\mathbf{i}^3\,\mathcal{A}_\mathbf{i}^3\right)\,\eta_\mathbf{i}^3\,\xi_\mathbf{i}^3}{36\,\hbar\,\mathsf{B}_\mathbf{i}^3}\Big)\,\epsilon^2+\mathsf{O}[\epsilon]^3\Big]$$
$$\mathrm{a\Delta}\to\mathbb{EE}_{\{\mathbf{i}\}\to\{\mathbf{j},\mathbf{k}\}}\Big[\mathsf{a}_\mathbf{j}\,\alpha_\mathbf{i}+\mathsf{a}_\mathbf{k}\,\alpha_\mathbf{i},\ \mathsf{x}_\mathbf{j}\,\xi_\mathbf{i}+\mathsf{x}_\mathbf{k}\,\xi_\mathbf{i},\ \Big(-\hbar\,\mathsf{a}_\mathbf{j}\,\mathsf{x}_\mathbf{k}\,\xi_\mathbf{i}+\frac{1}{2}\,\gamma\,\hbar\,\mathsf{x}_\mathbf{j}\,\mathsf{x}_\mathbf{k}\,\xi_\mathbf{i}^2\Big)\,\epsilon+$$
$$\Big(\frac{1}{2}\,\hbar^2\,\mathsf{a}_\mathbf{j}^2\,\mathsf{x}_\mathbf{k}\,\xi_\mathbf{i}+\frac{1}{4}\,\gamma^2\,\hbar^2\,\mathsf{x}_\mathbf{j}\,\mathsf{x}_\mathbf{k}\,\xi_\mathbf{i}^2-\frac{1}{2}\,\gamma\,\hbar^2\,\mathsf{a}_\mathbf{j}\,\mathsf{x}_\mathbf{j}\,\mathsf{x}_\mathbf{k}\,\xi_\mathbf{i}^2+\frac{1}{6}\,\gamma^2\,\hbar^2\,\mathsf{x}_\mathbf{j}^2\,\mathsf{x}_\mathbf{k}\,\xi_\mathbf{i}^3+\frac{1}{6}\,\gamma^2\,\hbar^2\,\mathsf{x}_\mathbf{j}\,\mathsf{x}_\mathbf{k}^2\,\xi_\mathbf{i}^3\Big)\,\epsilon^2+\mathsf{O}[\epsilon]^3\Big]$$
$$\mathrm{b\Delta}\to\mathbb{EE}_{\{\mathbf{i}\}\to\{\mathbf{j},\mathbf{k}\}}\Big[\mathsf{b}_\mathbf{j}\,\beta_\mathbf{i}+\mathsf{b}_\mathbf{k}\,\beta_\mathbf{i},\ \mathsf{B}_\mathbf{k}\,\mathsf{y}_\mathbf{j}\,\eta_\mathbf{i}+\mathsf{y}_\mathbf{k}\,\eta_\mathbf{i},$$
$$\frac{1}{2}\,\gamma\,\hbar\,\mathsf{B}_\mathbf{k}\,\mathsf{y}_\mathbf{j}\,\mathsf{y}_\mathbf{k}\,\eta_\mathbf{i}^2\,\epsilon+\Big(\frac{1}{4}\,\gamma^2\,\hbar^2\,\mathsf{B}_\mathbf{k}\,\mathsf{y}_\mathbf{j}\,\mathsf{y}_\mathbf{k}\,\eta_\mathbf{i}^2+\frac{1}{6}\,\gamma^2\,\hbar^2\,\mathsf{B}_\mathbf{k}^2\,\mathsf{y}_\mathbf{j}^2\,\mathsf{y}_\mathbf{k}\,\eta_\mathbf{i}^3+\frac{1}{6}\,\gamma^2\,\hbar^2\,\mathsf{B}_\mathbf{k}\,\mathsf{y}_\mathbf{j}\,\mathsf{y}_\mathbf{k}^2\,\eta_\mathbf{i}^3\Big)\,\epsilon^2+\mathsf{O}[\epsilon]^3\Big]$$
$$\mathrm{d\Delta}\to\mathbb{EE}_{\{\mathbf{i}\}\to\{\mathbf{j},\mathbf{k}\}}\Big[\mathsf{a}_\mathbf{j}\,\alpha_\mathbf{i}+\mathsf{a}_\mathbf{k}\,\alpha_\mathbf{i}+\mathsf{b}_\mathbf{j}\,\beta_\mathbf{i}+\mathsf{b}_\mathbf{k}\,\beta_\mathbf{i},$$
$$\mathsf{y}_\mathbf{j}\,\eta_\mathbf{i}+\mathsf{B}_\mathbf{j}\,\mathsf{y}_\mathbf{k}\,\eta_\mathbf{i}+\mathsf{x}_\mathbf{j}\,\xi_\mathbf{i}+\mathsf{x}_\mathbf{k}\,\xi_\mathbf{i},\ \Big(\frac{1}{2}\,\gamma\,\hbar\,\mathsf{B}_\mathbf{j}\,\mathsf{y}_\mathbf{j}\,\mathsf{y}_\mathbf{k}\,\eta_\mathbf{i}^2-\hbar\,\mathsf{a}_\mathbf{j}\,\mathsf{x}_\mathbf{k}\,\xi_\mathbf{i}+\frac{1}{2}\,\gamma\,\hbar\,\mathsf{x}_\mathbf{j}\,\mathsf{x}_\mathbf{k}\,\xi_\mathbf{i}^2\Big)\,\epsilon+$$
$$\Big(\frac{1}{4}\,\gamma^2\,\hbar^2\,\mathsf{B}_\mathbf{j}\,\mathsf{y}_\mathbf{j}\,\mathsf{y}_\mathbf{k}\,\eta_\mathbf{i}^2+\frac{1}{6}\,\gamma^2\,\hbar^2\,\mathsf{B}_\mathbf{j}\,\mathsf{y}_\mathbf{j}^2\,\mathsf{y}_\mathbf{k}\,\eta_\mathbf{i}^3+\frac{1}{6}\,\gamma^2\,\hbar^2\,\mathsf{B}_\mathbf{j}^2\,\mathsf{y}_\mathbf{j}\,\mathsf{y}_\mathbf{k}^2\,\eta_\mathbf{i}^3+\frac{1}{2}\,\hbar^2\,\mathsf{a}_\mathbf{j}^2\,\mathsf{x}_\mathbf{k}\,\xi_\mathbf{i}+$$
$$\frac{1}{4}\,\gamma^2\,\hbar^2\,\mathsf{x}_\mathbf{j}\,\mathsf{x}_\mathbf{k}\,\xi_\mathbf{i}^2-\frac{1}{2}\,\gamma\,\hbar^2\,\mathsf{a}_\mathbf{j}\,\mathsf{x}_\mathbf{j}\,\mathsf{x}_\mathbf{k}\,\xi_\mathbf{i}^2+\frac{1}{6}\,\gamma^2\,\hbar^2\,\mathsf{x}_\mathbf{j}^2\,\mathsf{x}_\mathbf{k}\,\xi_\mathbf{i}^3+\frac{1}{6}\,\gamma^2\,\hbar^2\,\mathsf{x}_\mathbf{j}\,\mathsf{x}_\mathbf{k}^2\,\xi_\mathbf{i}^3\Big)\,\epsilon^2+\mathsf{O}[\epsilon]^3\Big]$$
$$\mathsf{C}\to\mathbb{EE}_{\{\}\to\{\mathbf{i}\}}\Big[0,\ 0,\ \frac{\mathrm{Log}[\mathsf{B}_\mathbf{i}]}{2}-\frac{1}{2}\,(\hbar\,\mathsf{a}_\mathbf{i})\,\epsilon+\mathsf{O}[\epsilon]^3\Big]$$
$$\overline{\mathsf{C}}\to\mathbb{EE}_{\{\}\to\{\mathbf{i}\}}\Big[0,\ 0,\ -\frac{\mathrm{Log}[\mathsf{B}_\mathbf{i}]}{2}+\frac{1}{2}\,\hbar\,\mathsf{a}_\mathbf{i}\,\epsilon+\mathsf{O}[\epsilon]^3\Big]$$
$$\mathsf{Kink}\to\mathbb{EE}_{\{\}\to\{\mathbf{i}\}}\Big[\hbar\,\mathsf{a}_\mathbf{i}\,\mathsf{b}_\mathbf{i},\ \hbar\,\mathsf{x}_\mathbf{i}\,\mathsf{y}_\mathbf{i},\ -\frac{\mathrm{Log}[\mathsf{B}_\mathbf{i}]}{2}+\Big(\frac{\hbar\,\mathsf{a}_\mathbf{i}}{2}-\frac{1}{4}\,\gamma\,\hbar^3\,\mathsf{x}_\mathbf{i}^2\,\mathsf{y}_\mathbf{i}^2\Big)\,\epsilon+\frac{1}{9}\,\gamma^2\,\hbar^5\,\mathsf{x}_\mathbf{i}^3\,\mathsf{y}_\mathbf{i}^3\,\epsilon^2+\mathsf{O}[\epsilon]^3\Big]$$
$$\overline{\mathsf{Kink}}\to\mathbb{EE}_{\{\}\to\{\mathbf{i}\}}\Big[-\hbar\,\mathsf{a}_\mathbf{i}\,\mathsf{b}_\mathbf{i},\ -\frac{\hbar\,\mathsf{x}_\mathbf{i}\,\mathsf{y}_\mathbf{i}}{\mathsf{B}_\mathbf{i}},$$
$$\frac{\mathrm{Log}[\mathsf{B}_\mathbf{i}]}{2}+\Big(-\frac{\hbar\,\mathsf{a}_\mathbf{i}}{2}-\frac{\hbar^2\,\mathsf{a}_\mathbf{i}\,\mathsf{x}_\mathbf{i}\,\mathsf{y}_\mathbf{i}}{\mathsf{B}_\mathbf{i}}-\frac{3\,\gamma\,\hbar^3\,\mathsf{x}_\mathbf{i}^2\,\mathsf{y}_\mathbf{i}^2}{4\,\mathsf{B}_\mathbf{i}^2}\Big)\,\epsilon+\Big(-\frac{\hbar^3\,\mathsf{a}_\mathbf{i}^2\,\mathsf{x}_\mathbf{i}\,\mathsf{y}_\mathbf{i}}{2\,\mathsf{B}_\mathbf{i}}+\frac{\gamma^2\,\hbar^4\,\mathsf{x}_\mathbf{i}^2\,\mathsf{y}_\mathbf{i}^2}{2\,\mathsf{B}_\mathbf{i}^2}-\frac{3\,\gamma\,\hbar^4\,\mathsf{a}_\mathbf{i}\,\mathsf{x}_\mathbf{i}^2\,\mathsf{y}_\mathbf{i}^2}{2\,\mathsf{B}_\mathbf{i}^2}-\frac{10\,\gamma^2\,\hbar^5\,\mathsf{x}_\mathbf{i}^3\,\mathsf{y}_\mathbf{i}^3}{9\,\mathsf{B}_\mathbf{i}^3}\Big)\,\epsilon^2+\mathsf{O}[\epsilon]^3\Big]$$
$$\mathrm{b2t}\to\mathbb{EE}_{\{\mathbf{i}\}\to\{\mathbf{i}\}}\Big[\mathsf{a}_\mathbf{i}\,\alpha_\mathbf{i}-\frac{\mathsf{t}_\mathbf{i}\,\beta_\mathbf{i}}{\gamma},\ \mathsf{y}_\mathbf{i}\,\eta_\mathbf{i}+\mathsf{x}_\mathbf{i}\,\xi_\mathbf{i},\ \frac{\mathsf{a}_\mathbf{i}\,\beta_\mathbf{i}\,\epsilon}{\gamma}+\mathsf{O}[\epsilon]^3\Big]$$
$$\mathrm{t2b}\to\mathbb{EE}_{\{\mathbf{i}\}\to\{\mathbf{i}\}}\Big[\mathsf{a}_\mathbf{i}\,\alpha_\mathbf{i}-\gamma\,\mathsf{b}_\mathbf{i}\,\tau_\mathbf{i},\ \mathsf{y}_\mathbf{i}\,\eta_\mathbf{i}+\mathsf{x}_\mathbf{i}\,\xi_\mathbf{i},\ \mathsf{a}_\mathbf{i}\,\tau_\mathbf{i}\,\epsilon+\mathsf{O}[\epsilon]^3\Big]$$

In[•]:=
```
degs = atoms /. 𝔼sp__[L_, Q_, P_] :>
   Exponent[Normal@CF@Log@P /. {(ν : x | y | ξ | η)ᵢ :> λ νᵢ, (ν : a | β)ᵢ :> λ² νᵢ}, λ]
```

Out[•]=
$$\{\mathrm{am}\to-\infty,\ \mathrm{bm}\to 4,\ \mathrm{dm}\to 4,\ \mathrm{R}\to 3,\ \overline{\mathrm{R}}\to 3,\ \mathrm{P}\to 3,\ \mathrm{aS}\to 6,\ \overline{\mathrm{aS}}\to 6,\ \mathrm{bS}\to 6,\ \overline{\mathrm{bS}}\to 6,$$
$$\mathrm{dS}\to 6,\ \mathrm{a\Delta}\to 3,\ \mathrm{b\Delta}\to 3,\ \mathrm{d\Delta}\to 3,\ \mathsf{C}\to 2,\ \overline{\mathsf{C}}\to 2,\ \mathsf{Kink}\to 6,\ \overline{\mathsf{Kink}}\to 6,\ \mathrm{b2t}\to 4,\ \mathrm{t2b}\to 2\}$$

```
In[•]:= Last /@ degs
Out[•]= {-∞, 4, 4, 3, 3, 3, 6, 6, 6, 6, 6, 3, 3, 3, 2, 2, 6, 6, 4, 2}

In[•]:= Max[Last /@ degs]
Out[•]= 6
```