```
In[•]:= SetDirectory["C:\\drorbn\\AcademicPensieve\\Projects\\SL2Invariant"];
        << SL2Invariant.m
```

```
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.
```

```
In[•]:= $k = 3
```

```
Out[•]= 3
```

```
In[•]:= R_{1,2}
```

$$\text{Out}[\bullet]= \mathbb{E}_{\{\}\to\{1,2\}}\Big[\hbar\, a_2\, b_1,\ \hbar\, x_2\, y_1,\ 1-\frac{1}{4}\left(\gamma\,\hbar^3\, x_2^2\, y_1^2\right)\epsilon+\left(\frac{1}{9}\gamma^2\,\hbar^5\, x_2^3\, y_1^3+\frac{1}{32}\gamma^2\,\hbar^6\, x_2^4\, y_1^4\right)\epsilon^2+\left(\frac{1}{48}\gamma^3\,\hbar^5\, x_2^2\, y_1^2-\frac{1}{16}\gamma^3\,\hbar^7\, x_2^4\, y_1^4-\frac{1}{36}\gamma^3\,\hbar^8\, x_2^5\, y_1^5-\frac{1}{384}\gamma^3\,\hbar^9\, x_2^6\, y_1^6\right)\epsilon^3+O[\epsilon]^4\Big]$$

```
In[•]:= Rb_{1,2}
```

$$\text{Out}[\bullet]= \mathbb{E}_{\{\}\to\{1,2\}}\Big[-\hbar\, a_2\, b_1,\ -\frac{\hbar\, x_2\, y_1}{B_1},\ 1+\left(-\frac{\hbar^2\, a_2\, x_2\, y_1}{B_1}-\frac{3\gamma\,\hbar^3\, x_2^2\, y_1^2}{4\,B_1^2}\right)\epsilon+\left(-\frac{\hbar^3\, a_2^2\, x_2\, y_1}{2\,B_1}+\frac{\gamma^2\,\hbar^4\, x_2^2\, y_1^2}{2\,B_1^2}-\frac{3\gamma\,\hbar^4\, a_2\, x_2^2\, y_1^2}{2\,B_1^2}+\frac{\hbar^4\, a_2^2\, x_2^2\, y_1^2}{2\,B_1^2}-\frac{10\gamma^2\,\hbar^5\, x_2^3\, y_1^3}{9\,B_1^3}+\frac{3\gamma\,\hbar^5\, a_2\, x_2^3\, y_1^3}{4\,B_1^3}+\frac{9\gamma^2\,\hbar^6\, x_2^4\, y_1^4}{32\,B_1^4}\right)\epsilon^2+\left(-\frac{\hbar^4\, a_2^3\, x_2\, y_1}{6\,B_1}-\frac{3\gamma^3\,\hbar^5\, x_2^2\, y_1^2}{16\,B_1^2}+\frac{\gamma^2\,\hbar^5\, a_2\, x_2^2\, y_1^2}{B_1^2}-\frac{3\gamma\,\hbar^5\, a_2^2\, x_2^2\, y_1^2}{2\,B_1^2}+\frac{\hbar^5\, a_2^3\, x_2^2\, y_1^2}{2\,B_1^2}+\frac{2\gamma^3\,\hbar^6\, x_2^3\, y_1^3}{B_1^3}-\frac{23\gamma^2\,\hbar^6\, a_2\, x_2^3\, y_1^3}{6\,B_1^3}+\frac{15\gamma\,\hbar^6\, a_2^2\, x_2^3\, y_1^3}{8\,B_1^3}-\frac{\hbar^6\, a_2^3\, x_2^3\, y_1^3}{6\,B_1^3}-\frac{41\gamma^3\,\hbar^7\, x_2^4\, y_1^4}{16\,B_1^4}+\frac{161\gamma^2\,\hbar^7\, a_2\, x_2^4\, y_1^4}{72\,B_1^4}-\frac{3\gamma\,\hbar^7\, a_2^2\, x_2^4\, y_1^4}{8\,B_1^4}+\frac{5\gamma^3\,\hbar^8\, x_2^5\, y_1^5}{6\,B_1^5}-\frac{9\gamma^2\,\hbar^8\, a_2\, x_2^5\, y_1^5}{32\,B_1^5}-\frac{9\gamma^3\,\hbar^9\, x_2^6\, y_1^6}{128\,B_1^6}\right)\epsilon^3+O[\epsilon]^4\Big]$$

```
In[•]:= CF /@ (Rb_{1,2} /. {ℏ → -ℏ, y_1 → y_1 / B_1})
```

$$\text{Out}[\bullet]= \mathbb{E}_{\{\}\to\{1,2\}}\Big[-\hbar\, a_2\, b_1,\ -\frac{\hbar\, x_2\, y_1}{B_1},\ 1+\frac{\gamma\,\hbar^3\, x_2^2\, y_1^2\,\epsilon}{4\,B_1^2}+\left(-\frac{\gamma^2\,\hbar^5\, x_2^3\, y_1^3}{9\,B_1^3}+\frac{\gamma^2\,\hbar^6\, x_2^4\, y_1^4}{32\,B_1^4}\right)\epsilon^2+\left(-\frac{\gamma^3\,\hbar^5\, x_2^2\, y_1^2}{48\,B_1^2}+\frac{\gamma^3\,\hbar^7\, x_2^4\, y_1^4}{16\,B_1^4}-\frac{\gamma^3\,\hbar^8\, x_2^5\, y_1^5}{36\,B_1^5}+\frac{\gamma^3\,\hbar^9\, x_2^6\, y_1^6}{384\,B_1^6}\right)\epsilon^3+O[\epsilon]^4\Big]$$