Pensieve header: The Λ of CU.

Startup

In[∘]:=
```
SetDirectory["C:\\drorbn\\AcademicPensieve\\Projects\\SL2Portfolio2"];
<< "../Profile/Profile.m";
$k = 2;
<< "Engine-Speedy.m";
<< "Objects.m";
```

```
This is Profile.m of http://www.drorbn.net/AcademicPensieve/Projects/Profile/.
This version: June 2018. Original version: July 1994.
```

In[∘]:=

$$\Lambda = \left(\eta_i + \frac{e^{-\gamma\alpha_i-\epsilon\beta_i}\eta_j}{1+\gamma\epsilon\eta_j\xi_i}\right)y_k + \left(\beta_i+\beta_j+\frac{\mathrm{Log}[1+\gamma\epsilon\eta_j\xi_i]}{\epsilon}\right)b_k + \left(\alpha_i+\alpha_j+\frac{\mathrm{Log}[1+\gamma\epsilon\eta_j\xi_i]}{\gamma}\right)a_k + \left(\frac{e^{-\gamma\alpha_j-\epsilon\beta_j}\xi_i}{1+\gamma\epsilon\eta_j\xi_i}+\xi_j\right)x_k$$

Out[∘]=

$$a_k\left(\frac{\mathrm{Log}[1+\gamma\epsilon\eta_j\xi_i]}{\gamma}+\alpha_i+\alpha_j\right) + b_k\left(\frac{\mathrm{Log}[1+\gamma\epsilon\eta_j\xi_i]}{\epsilon}+\beta_i+\beta_j\right) + y_k\left(\eta_i+\frac{e^{-\gamma\alpha_i-\epsilon\beta_i}\eta_j}{1+\gamma\epsilon\eta_j\xi_i}\right) + x_k\left(\frac{e^{-\gamma\alpha_j-\epsilon\beta_j}\xi_i}{1+\gamma\epsilon\eta_j\xi_i}+\xi_j\right)$$

In[∘]:= $\mathrm{cm}_{i,j\to k}$

Out[∘]=

$$\mathbb{E}_{\{i,j\}\to\{k\}}\Big[a_k\alpha_i + a_k\alpha_j + b_k\beta_i + b_k\beta_j,\; y_k\eta_i + \frac{y_k\eta_j}{\mathcal{A}_i} + \frac{x_k\xi_i}{\mathcal{A}_j} + \gamma b_k\eta_j\xi_i + x_k\xi_j,$$

$$1 + \left(-\frac{y_k\beta_i\eta_j}{\mathcal{A}_i} - \frac{x_k\beta_j\xi_i}{\mathcal{A}_j} + a_k\eta_j\xi_i - \frac{\gamma y_k\eta_j^2\xi_i}{\mathcal{A}_i} - \frac{\gamma x_k\eta_j\xi_i^2}{\mathcal{A}_j} - \frac{1}{2}\gamma^2 b_k\eta_j^2\xi_i^2\right)\epsilon +$$

$$\Bigg(\frac{y_k\beta_i^2\eta_j}{2\mathcal{A}_i} + \frac{y_k^2\beta_i^2\eta_j^2}{2\mathcal{A}_i^2} + \frac{x_k\beta_j^2\xi_i}{2\mathcal{A}_j} + \frac{x_k y_k\beta_i\beta_j\eta_j\xi_i}{\mathcal{A}_i\mathcal{A}_j} + \frac{\gamma y_k\beta_i\eta_j^2\xi_i}{\mathcal{A}_i} - \frac{a_k y_k\beta_i\eta_j^2\xi_i}{\mathcal{A}_i} + \frac{\gamma y_k^2\beta_i\eta_j^3\xi_i}{\mathcal{A}_i^2} +$$

$$\frac{x_k^2\beta_j^2\xi_i^2}{2\mathcal{A}_j^2} + \frac{\gamma x_k\beta_j\eta_j\xi_i^2}{\mathcal{A}_j} - \frac{a_k x_k\beta_j\eta_j\xi_i^2}{\mathcal{A}_j} - \frac{1}{2}\gamma a_k\eta_j^2\xi_i^2 + \frac{1}{2}a_k^2\eta_j^2\xi_i^2 + \frac{\gamma x_k y_k\beta_i\eta_j^2\xi_i^2}{\mathcal{A}_i\mathcal{A}_j} +$$

$$\frac{\gamma x_k y_k\beta_j\eta_j^2\xi_i^2}{\mathcal{A}_i\mathcal{A}_j} + \frac{\gamma^2 y_k\eta_j^3\xi_i^2}{\mathcal{A}_i} - \frac{\gamma a_k y_k\eta_j^3\xi_i^2}{\mathcal{A}_i} + \frac{\gamma^2 b_k y_k\beta_i\eta_j^3\xi_i^2}{2\mathcal{A}_i} + \frac{\gamma^2 y_k^2\eta_j^4\xi_i^2}{2\mathcal{A}_i^2} + \frac{\gamma x_k^2\beta_j\eta_j\xi_i^3}{\mathcal{A}_j^2} +$$

$$\frac{\gamma^2 x_k\eta_j^2\xi_i^3}{\mathcal{A}_j} - \frac{\gamma a_k x_k\eta_j^2\xi_i^3}{\mathcal{A}_j} + \frac{\gamma^2 b_k x_k\beta_j\eta_j^2\xi_i^3}{2\mathcal{A}_j} + \frac{1}{3}\gamma^3 b_k\eta_j^3\xi_i^3 - \frac{1}{2}\gamma^2 a_k b_k\eta_j^3\xi_i^3 +$$

$$\frac{\gamma^2 x_k y_k\eta_j^3\xi_i^3}{\mathcal{A}_i\mathcal{A}_j} + \frac{\gamma^3 b_k y_k\eta_j^4\xi_i^3}{2\mathcal{A}_i} + \frac{\gamma^2 x_k^2\eta_j^2\xi_i^4}{2\mathcal{A}_j^2} + \frac{\gamma^3 b_k x_k\eta_j^3\xi_i^4}{2\mathcal{A}_j} + \frac{1}{8}\gamma^4 b_k^2\eta_j^4\xi_i^4\Bigg)\epsilon^2 + O[\epsilon]^3\Big]$$

𝔼

```
𝔼dr_[Λ_] := CF@Module[{L, Λ0 = Limit[Λ, ϵ → 0]}, 𝔼dr[
    L = Λ0 /. (η | y | ξ | x)_ → 0, Λ0 - L, e^(Λ-Λ0)] /. l2U]$k
```

In[∘]:= $\mathbb{E}_{\{i,j\}\to\{k\}}[\Lambda]$

Out[∘]= $$\mathbb{E}_{\{i,j\}\to\{k\}}\Big[a_k\alpha_i + a_k\alpha_j + b_k\beta_i + b_k\beta_j,\ y_k\eta_i + \frac{y_k\eta_j}{\mathcal{A}_i} + \frac{x_k\xi_i}{\mathcal{A}_j} + \gamma b_k\eta_j\xi_i + x_k\xi_j,$$
$$1 + \left(-\frac{y_k\beta_i\eta_j}{\mathcal{A}_i} - \frac{x_k\beta_j\xi_i}{\mathcal{A}_j} + a_k\eta_j\xi_i - \frac{\gamma y_k\eta_j^2\xi_i}{\mathcal{A}_i} - \frac{\gamma x_k\eta_j\xi_i^2}{\mathcal{A}_j} - \frac{1}{2}\gamma^2 b_k\eta_j^2\xi_i^2\right)\epsilon +$$
$$\left(\frac{y_k\beta_i^2\eta_j}{2\mathcal{A}_i} + \frac{y_k^2\beta_i^2\eta_j^2}{2\mathcal{A}_i^2} + \frac{x_k\beta_j^2\xi_i}{2\mathcal{A}_j} + \frac{x_k y_k\beta_i\beta_j\eta_j\xi_i}{\mathcal{A}_i\mathcal{A}_j} + \frac{\gamma y_k\beta_i\eta_j^2\xi_i}{\mathcal{A}_i} - \frac{a_k y_k\beta_i\eta_j^2\xi_i}{\mathcal{A}_i} + \frac{\gamma y_k^2\beta_i\eta_j^3\xi_i}{\mathcal{A}_i^2} +\right.$$
$$\frac{x_k^2\beta_j^2\xi_i^2}{2\mathcal{A}_j^2} + \frac{\gamma x_k\beta_j\eta_j\xi_i^2}{\mathcal{A}_j} - \frac{a_k x_k\beta_j\eta_j\xi_i^2}{\mathcal{A}_j} - \frac{1}{2}\gamma a_k\eta_j^2\xi_i^2 + \frac{1}{2}a_k^2\eta_j^2\xi_i^2 + \frac{\gamma x_k y_k\beta_i\eta_j^2\xi_i^2}{\mathcal{A}_i\mathcal{A}_j} +$$
$$\frac{\gamma x_k y_k\beta_j\eta_j^2\xi_i^2}{\mathcal{A}_i\mathcal{A}_j} + \frac{\gamma^2 y_k\eta_j^3\xi_i^2}{\mathcal{A}_i} - \frac{\gamma a_k y_k\eta_j^3\xi_i^2}{\mathcal{A}_i} + \frac{\gamma^2 b_k y_k\beta_i\eta_j^3\xi_i^2}{2\mathcal{A}_i} + \frac{\gamma^2 y_k^2\eta_j^4\xi_i^2}{2\mathcal{A}_i^2} + \frac{\gamma x_k^2\beta_j\eta_j\xi_i^3}{\mathcal{A}_j^2} +$$
$$\frac{\gamma^2 x_k\eta_j^2\xi_i^3}{\mathcal{A}_j} - \frac{\gamma a_k x_k\eta_j^2\xi_i^3}{\mathcal{A}_j} + \frac{\gamma^2 b_k x_k\beta_j\eta_j^2\xi_i^3}{2\mathcal{A}_j} + \frac{1}{3}\gamma^3 b_k\eta_j^3\xi_i^3 - \frac{1}{2}\gamma^2 a_k b_k\eta_j^3\xi_i^3 +$$
$$\left.\frac{\gamma^2 x_k y_k\eta_j^3\xi_i^3}{\mathcal{A}_i\mathcal{A}_j} + \frac{\gamma^3 b_k y_k\eta_j^4\xi_i^3}{2\mathcal{A}_i} + \frac{\gamma^2 x_k^2\eta_j^2\xi_i^4}{2\mathcal{A}_j^2} + \frac{\gamma^3 b_k x_k\eta_j^3\xi_i^4}{2\mathcal{A}_j} + \frac{1}{8}\gamma^4 b_k^2\eta_j^4\xi_i^4\right)\epsilon^2 + O[\epsilon]^3\Big]$$

In[∘]:= $\mathbb{E}_{\{i,j\}\to\{k\}}[\Lambda] \equiv cm_{i,j\to k}$

Out[∘]= True