Pensieve header: The $sl_2^{(k)}$ program (aborted).

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SetDirectory["C:\\drorbn\\AcademicPensieve\\2017-08"];
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$\mathbb{E}[\omega, L, Q, P]$ stands for $\omega^{-1} e^{L+\omega^{-1} Q+}$

```
CF[ℰ_] := Module[{vars = Union@Cases[ℰ, y_ | a_ | x_, ∞]},
   If[vars === {}, Factor[ℰ],
    Total[CoefficientRules[ℰ, vars] /. (p_ → c_) :↦ Factor[c] Times @@ (vars^p)]]];
CF[ℰ_𝔼] := CF /@ ℰ;
```

```
𝔼[i_, j_, s_] := 𝔼[1, (-1)^s l_j, (-t)^s e_i f_j, t^s e_i l_(1+s) i-s j f_j + (-1)^s l_i l_j + (-t^2)^s e_i^2 f_j^2 / 4];
𝔼[i_, s_] := 𝔼[1, 0, 0, s l_i];
𝔼 /: 𝔼[1, L1_, Q1_, P1_] 𝔼[1, L2_, Q2_, P2_] := 𝔼[1, L1 + L2, Q1 + Q2, P1 + P2];
```

```
DP_{x_→D_α, y_→D_β}[P_][f_] :=
 Total[CoefficientRules[P, {x, y}] /. ({m_, n_} → c_) :↦ c D[f, {α, m}, {β, n}]]
```

```
S_{l_j (x:e|f)_i →k}[𝔼[ω_, L_, Q_, P_]] := With[{λ = ∂_{l_j} L, α = ∂_{x_i} Q, q = e^γ β x_k + γ l_k},
   CF[𝔼[ω, L /. l_j → l_k, t^λ α x_k + (Q /. x_i → 0), e^-q DP_{l_j→D_γ, x_i→D_β}[P][e^q] /. {β → α / ω, γ → λ Log[t]}]]];
```

```
Λ[k_] := ((t - 1) (2 (α β + δ μ)^2 - α^2 β^2) - 4 e_k l_k f_k δ^2 μ^2 -
    δ (1 + μ) (f_k^2 α^2 + e_k^2 β^2) - e_k^2 f_k^2 δ^3 (1 + 3 μ) -
    2 (α β + 2 δ μ + e_k f_k δ^2 (1 + 2 μ) + 2 l_k δ μ^2) (f_k α + e_k β) - 4 (l_k μ^2 + e_k f_k δ (1 + μ)) (α β + δ μ)) (1 + t) / 4;
```

```
S_{f_i e_j →k}[𝔼[ω_, L_, Q_, P_]] := With[{q = ((1 - t) α β + β e_k + α f_k + δ e_k f_k) / μ},
   CF[𝔼[μ ω, L, μ ω q + μ (Q /. f_i | e_j → 0), μ^4 e^-q DP_{f_i→D_α, e_j→D_β}[P][e^q] + ω^4 Λ[k]] /. μ → 1 + (t - 1) δ /.
    {α → ω^-1 (∂_{f_i} Q /. e_j → 0), β → ω^-1 (∂_{e_j} Q /. f_i → 0), δ → ω^-1 ∂_{f_i, e_j} Q}]];
```

```
m_{i_, j_→k_}[Z_𝔼] := Module[{x, z},
  CF[(Z // S_{f_i e_j→x} // S_{l_i e_x→x} // S_{f_x l_j→x}) /. z_{i|j|x} → z_k]]
```

$$\rho_1[\mathbb{E}[\omega\_,\ \_,\ \_,\ P\_]] := \mathrm{CF}\left[\frac{t\left(\left(P /. e\_ \mid l\_ \mid f\_ \to 0\right) - t\,\omega^3\,(\partial_t\,\omega)\right)}{(t-1)^2\,\omega^2}\right]$$