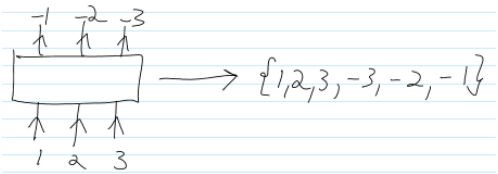


```
SetDirectory["C:\\drorbn\\AcademicPensieve\\2014-07"];
<< "MetaCalculi/MetaCalculi-Program.m"
```

```
Conj[γ_Γ, Ω_Γ] := Module[{n, γ1},
  n = Length[dL[γ]];
  γ1 = γ * (Ω // dσ@@Table[a → τ[a], {a, n}]);
  Do[γ1 = γ1 // dm[τ[a], a, a], {a, n}];
  Do[γ1 = γ1 // dm[a, -a, a], {a, n}];
  γ1
 ]
```

```
Ω0[n_Integer] := Table[
   Which[i > j, 0, i == j, (1 - Ti)^-1, i < j, 1],
   {i, n}, {j, n}];
Ω1[n_Integer] := Simplify[α Ω0[n] + β Transpose[Ω0[n] /. Ta_ :→ 1 / Ta]];
```

```
MatrixForm /@ Simplify /@ {Ω0[3], Ω1[3], Inverse[Ω1[3]]}
```

$$\left\{\begin{pmatrix} \frac{1}{1-T_1} & 1 & 1 \\ 0 & \frac{1}{1-T_2} & 1 \\ 0 & 0 & \frac{1}{1-T_3} \end{pmatrix}, \begin{pmatrix} \frac{1+T_1}{1-T_1} & 1 & 1 \\ -1 & \frac{1+T_2}{1-T_2} & 1 \\ -1 & -1 & \frac{1+T_3}{1-T_3} \end{pmatrix}, \begin{pmatrix} -\frac{(-1+T_1)\,(1+T_2\,T_3)}{2+2\,T_1\,T_2\,T_3} & -\frac{(-1+T_1)\,(-1+T_2)}{2+2\,T_1\,T_2\,T_3} & -\frac{(-1+T_1)\,T_2\,(-1+T_3)}{2+2\,T_1\,T_2\,T_3} \\ \frac{(-1+T_1)\,(-1+T_2)\,T_3}{2+2\,T_1\,T_2\,T_3} & -\frac{(-1+T_2)\,(1+T_1\,T_3)}{2+2\,T_1\,T_2\,T_3} & -\frac{(-1+T_2)\,(-1+T_3)}{2+2\,T_1\,T_2\,T_3} \\ \frac{(-1+T_1)\,(-1+T_3)}{2+2\,T_1\,T_2\,T_3} & \frac{T_1\,(-1+T_2)\,(-1+T_3)}{2+2\,T_1\,T_2\,T_3} & -\frac{(1+T_1\,T_2)\,(-1+T_3)}{2+2\,T_1\,T_2\,T_3} \end{pmatrix}\right\}$$

```
Ω[io___] := Ω[{io}];
Ω[io_List] /; EvenQ[Length@io] :=
 Module[{n, std, i, Ω0, Ω0i, j, nio, k, x, y, X},
  n = Length[io] / 2;
  std = Join[Range[n], Range[-n, -1]];
  i = 1; While[i ≤ 2 n && io[[i]] == std[[i]], ++i];
  If[i > 2 n,
   Ω0 = Ω1[n]; Ω0i = Inverse[Ω0];
   Γ[1, 0, Sum[t_a h_b Ω0[[a, b]], {a, n}, {b, n}]]
    Γ[1, 0, Sum[t_-a h_-b Ω0i[[a, b]], {a, n}, {b, n}]],
   (* Else *) j = Position[io, std[[i]]][[1, 1]] - 1;
   nio = io; nio[[{j, j + 1}]] = nio[[{j + 1, j}]];
   Ω1 = Ω[nio] Γ[Xm[x, y]];
   Ω1 = If[(k = nio[[j]]) > 0, Ω1 // dm[x, k, k], Ω1 // dS[x] // dm[k, x, k]];
   Ω1 = If[(k = nio[[j + 1]]) > 0, Ω1 // dm[y, k, k], Ω1 // dS[y] // dm[k, y, k]];
   X = Γ[Xp[x, y]]; If[nio[[j]] > 0, X = X // dS[x]]; If[nio[[j + 1]] > 0, X = X // dS[y]];
   Ω1 = Ω1 Mirror[X];
   Ω1 = If[(k = nio[[j]]) > 0, Ω1 // dm[k, x, k], Ω1 // dm[x, k, k]];
   Ω1 = If[(k = nio[[j + 1]]) > 0, Ω1 // dm[k, y, k], Ω1 // dm[y, k, k]];
   ΓCollect[Ω1 /. T_i_ :> T_Abs[i]]
  ]
 ]
```

```
{Ω[1, 2, -2, -1], Ω[1, -1, 2, -2], Ω[-1, 2, -2, 1]} /. {α → β T2} // ColumnForm
```

$$\begin{pmatrix} 1 & S_{-2} & S_{-1} & S_1 & S_2 \\ S_{-2} & -\frac{T_1-T_2}{\beta\,(-1+T_1)\,T_2} & \frac{1}{\beta\,T_2} & 0 & 0 \\ S_{-1} & \frac{1}{\beta} & 0 & 0 & 0 \\ S_1 & 0 & 0 & \frac{\beta\,(T_1-T_2)}{-1+T_1} & \beta\,T_2 \\ S_2 & 0 & 0 & \beta & 0 \\ \Gamma & 0 & 0 & 0 & 0 \end{pmatrix}$$

$$\begin{pmatrix} \frac{-\beta^2\,T_2^2+\beta^2\,T_1\,T_2^2+\beta^2\,T_2^3-\beta^2\,T_1\,T_2^3}{T_2\,(-\beta+\beta\,T_2)\,(\beta\,T_2-\beta\,T_1\,T_2)} & S_{-2} & S_{-1} & S_1 & S_2 \\ S_{-2} & \frac{-T_1+T_2}{\beta\,(-1+T_1)\,T_2} & \frac{1}{\beta\,T_2} & \frac{-1+T_2}{T_2} & 0 \\ S_{-1} & \frac{1}{\beta} & 0 & 0 & 0 \\ S_1 & 1-T_2 & 0 & \frac{\beta\,(T_1-T_2)}{-1+T_1} & \beta\,T_2 \\ S_2 & 0 & 0 & \beta & 0 \\ \Gamma & 0 & 0 & 0 & 0 \end{pmatrix}$$

$$\begin{pmatrix} \frac{-\beta^2\,T_2+3\,\beta^2\,T_1\,T_2-2\,\beta^2\,T_1^2\,T_2+\beta^2\,T_2^2-6\,\beta^2\,T_1\,T_2^2+5\,\beta^2\,T_1^2\,T_2^2+5\,\beta^2\,T_1\,T_2^3-6\,\beta^2\,T_1^2\,T_2^3+\beta^2\,T_1^3\,T_2^3-2\,\beta^2\,T_1\,T_2^4+3\,\beta^2\,T_1^2\,T_2^4-\beta^2\,T_1^3\,T_2^4}{T_1\,T_2\,(-\beta+\beta\,T_2)\,(\beta\,T_2-\beta\,T_1\,T_2)} & S_{-2} \\ S_{-2} & -\frac{-1+2\,T_1-2\,T} \\ S_{-1} & \frac{(1-T_1+T} \\ S_1 & -\frac{(-1+T_2)\,(-1+2\,T_1} \\ S_2 & \frac{(-2+T_1)\,T_1\,(-} \\ \Gamma & 0 \end{pmatrix}$$

```
Simplify[ -(-1+T2) (1-T1+T2+T1 T2-T2^2+T1 T2^2) / (1-T1+3 T2-T1 T2-T2^2+3 T1 T2^2-T2^3+T1 T2^3) / -(-1+T2) (1-T1+T1 T2+T1^2 T2-T1^2 T2^2+T1^3 T2^2) / (2-3 T1+T1^2+7 T1 T2-5 T1^2 T2-5 T1 T2^2+7 T1^2 T2^2+T1 T2^3-3 T1^2 T2^3+2 T1^3 T2^3) ]
```

$$\left(\left(2+T_1\,(-3+T_2)\,(-1+T_2)^2+2\,T_1^3\,T_2^3-T_1^2\,(-1+T_2)^2\,(-1+3\,T_2)\right)\left(1+T_2-T_2^2+T_1\left(-1+T_2+T_2^2\right)\right)\right) \Big/ \left(\left(1+T_1\,(-1+T_2)-T_1^2\,(-1+T_2)\,T_2+T_1^3\,T_2^2\right)\left(1+3\,T_2-T_2^2-T_2^3+T_1\left(-1-T_2+3\,T_2^2+T_2^3\right)\right)\right)$$