Pensieve Header: β-calculus with controlled column sums.

```
βSimplify = Factor;
SetAttributes[βCollect, Listable];
βCollect[B[ω_, σ_, μ_]] := B[
   βSimplify[ω], σ,
   Collect[μ, _h, Collect[#, _t, βSimplify] &]
  ];
(* "L" for "Labels" *)
hL[B[ω_, σ_, μ_]] := Union[Cases[{σ}, h[s_] :> s, Infinity]];
tL[β_] := Union[Cases[β, t[s_] | T_s_ :> s, Infinity]];
dL[β_] := Union[hL[β], tL[β]];
βForm[B[ω_, σ_, μ_]] := Module[
   {tails, heads, mat},
   tails = tL[B[ω, σ, μ]]; heads = hL[B[ω, σ, μ]];
   mat = Outer[βSimplify[Coefficient[μ, h[#1] t[#2]]] &, heads, tails];
   PrependTo[mat, t /@ tails];
   mat = Join[
     {Prepend[h /@ heads, ω]},
     Transpose[mat],
     {Prepend[D[σ, h[#]] & /@ heads, "1+Σ/ω"]}
    ];
   MatrixForm[mat]
  ];
βForm[else_] := else /. β_B :> βForm[β];
tm[x_, y_, z_][β_] := β /. {t[x] → t[z], t[y] → t[z], T_x → T_z, T_y → T_z};
hm[x_, y_, z_][B[ω_, σ_, μ_]] := B[ω,
    h[z] D[σ, h[x]] D[σ, h[y]] + (σ /. h[x] | h[y] → 0),
    h[z] (D[μ, h[x]] + D[σ, h[x]] D[μ, h[y]]) + (μ /. h[x] | h[y] → 0)
   ] // βCollect;
swapth[y_, x_][B[ω_, σ_, μ_]] := Module[
   {α, β, γ, δ},
   α = Coefficient[μ, h[x] t[y]];
   β = D[μ, t[y]] /. h[x] → 0;
   γ = D[μ, h[x]] /. t[y] → 0;
   δ = μ /. h[x] | t[y] → 0;
   B[ω + α, σ, Plus[
      D[σ, h[x]] α * h[x] t[y],
      D[σ, h[x]] β * t[y],
      γ * h[x],
      ((ω + α) δ - γ * β) / ω
     ]] // βCollect
  ];
dm[x_, y_, z_][β_] := β // swapth[x, y] // hm[x, y, z] // tm[x, y, z];
B /: B[ω1_, σ1_, μ1_] B[ω2_, σ2_, μ2_] := B[ω1 * ω2, σ1 + σ2, ω2 μ1 + ω1 μ2];
(* Cheat *)
Rp[x_, y_] := B[1, h[x] + T * h[y], (T - 1) * t[x] h[y]];
Rm[x_, y_] := B[1, h[x] + h[y] / T, (1 / T - 1) * t[x] h[y]];
(* End cheat *)Rp[x_, y_] := B[1, h[x] + T_x h[y], (T_x - 1) * t[x] h[y]];
Rm[x_, y_] := B[1, h[x] + h[y] / T_x, (1 / T_x - 1) * t[x] h[y]];
Unprotect[NonCommutativeMultiply];
Format[β_B, StandardForm] := βForm[β];
```

```
{Rp[1, 2], Rm[1, 2]}
```

$$\left\{\begin{pmatrix} 1 & h[1] & h[2] \\ t[1] & 0 & -1+T_1 \\ 1+\Sigma/\omega & 1 & T_1 \end{pmatrix}, \begin{pmatrix} 1 & h[1] & h[2] \\ t[1] & 0 & -\frac{-1+T_1}{T_1} \\ 1+\Sigma/\omega & 1 & \frac{1}{T_1} \end{pmatrix}\right\}$$

Knot[8, 17] is calculated as in 120406 Calculator.nb.

```
Rm[12, 1]
```

$$\begin{pmatrix} 1 & h[1] & h[12] \\ t[12] & -\frac{-1+T_{12}}{T_{12}} & 0 \\ 1+\Sigma/\omega & \frac{1}{T_{12}} & 1 \end{pmatrix}$$

```
Rm[12, 1] Rm[2, 7] // dm[1, 2, 1]
```

$$\begin{pmatrix} 1 & h[1] & h[7] & h[12] \\ t[1] & 0 & -\frac{-1+T_1}{T_1} & 0 \\ t[12] & -\frac{-1+T_{12}}{T_{12}} & 0 & 0 \\ 1+\Sigma/\omega & \frac{1}{T_{12}} & \frac{1}{T_1} & 1 \end{pmatrix}$$

```
(Rm[12, 1] Rm[2, 7] // dm[1, 2, 1]) Rm[8, 3] // dm[1, 3, 1]
```

$$\begin{pmatrix} 1 & h[1] & h[7] & h[8] & h[12] \\ t[1] & 0 & -\frac{-1+T_1}{T_1 T_8} & 0 & 0 \\ t[8] & -\frac{-1+T_8}{T_8 T_{12}} & -\frac{(-1+T_1)(-1+T_8)}{T_1 T_8} & 0 & 0 \\ t[12] & -\frac{-1+T_{12}}{T_{12}} & 0 & 0 & 0 \\ 1+\Sigma/\omega & \frac{1}{T_8 T_{12}} & \frac{1}{T_1} & 1 & 1 \end{pmatrix}$$

```
((Rm[12, 1] Rm[2, 7] // dm[1, 2, 1]) Rm[8, 3] // dm[1, 3, 1]) Rm[4, 11] // dm[1, 4, 1]
```

$$\begin{pmatrix} 1 & h[1] & h[7] & h[8] & h[11] & h[12] \\ t[1] & 0 & -\frac{-1+T_1}{T_1 T_8} & 0 & -\frac{-1+T_1}{T_1} & 0 \\ t[8] & -\frac{-1+T_8}{T_8 T_{12}} & -\frac{(-1+T_1)(-1+T_8)}{T_1 T_8} & 0 & 0 & 0 \\ t[12] & -\frac{-1+T_{12}}{T_{12}} & 0 & 0 & 0 & 0 \\ 1+\Sigma/\omega & \frac{1}{T_8 T_{12}} & \frac{1}{T_1} & 1 & \frac{1}{T_1} & 1 \end{pmatrix}$$

```
(((Rm[12, 1] Rm[2, 7] // dm[1, 2, 1]) Rm[8, 3] // dm[1, 3, 1]) Rm[4, 11] // dm[1, 4, 1])
  Rp[16, 5] // dm[1, 5, 1]
```

$$\begin{pmatrix} 1 & h[1] & h[7] & h[8] & h[11] & h[12] & h[16] \\ t[1] & 0 & -\frac{(-1+T_1)\,T_{16}}{T_1 T_8} & 0 & -\frac{(-1+T_1)\,T_{16}}{T_1} & 0 & 0 \\ t[8] & -\frac{-1+T_8}{T_8 T_{12}} & -\frac{(-1+T_1)(-1+T_8)}{T_1 T_8} & 0 & 0 & 0 & 0 \\ t[12] & -\frac{-1+T_{12}}{T_{12}} & 0 & 0 & 0 & 0 & 0 \\ t[16] & \frac{-1+T_{16}}{T_8 T_{12}} & \frac{(-1+T_1)(-1+T_{16})}{T_1 T_8} & 0 & \frac{(-1+T_1)(-1+T_{16})}{T_1} & 0 & 0 \\ 1+\Sigma/\omega & \frac{T_{16}}{T_8 T_{12}} & \frac{1}{T_1} & 1 & \frac{1}{T_1} & 1 & 1 \end{pmatrix}$$

```
((((Rm[12, 1] Rm[2, 7] // dm[1, 2, 1]) Rm[8, 3] // dm[1, 3, 1]) Rm[4, 11] // dm[1, 4, 1])
      Rp[16, 5] // dm[1, 5, 1]) Rp[6, 13] // dm[1, 6, 1]
```

	1	h[1]	h[7]	h[8]	h[11]	h[12]	h[13]	h[16]
t[1]	0	$-\frac{(-1+T_1)\,T_{16}}{T_1\,T_8}$	0	$-\frac{(-1+T_1)\,T_{16}}{T_1}$	0	$-1+T_1$	0
t[8]	$-\frac{-1+T_8}{T_8\,T_{12}}$	$-\frac{(-1+T_1)\,(-1+T_8)}{T_1\,T_8}$	0	0	0	0	0
t[12]	$-\frac{-1+T_{12}}{T_{12}}$	0	0	0	0	0	0
t[16]	$\frac{-1+T_{16}}{T_8\,T_{12}}$	$\frac{(-1+T_1)\,(-1+T_{16})}{T_1\,T_8}$	0	$\frac{(-1+T_1)\,(-1+T_{16})}{T_1}$	0	0	0
$1+\Sigma/\omega$	$\frac{T_{16}}{T_8\,T_{12}}$	$\frac{1}{T_1}$	1	$\frac{1}{T_1}$	1	T_1	1

```
((((Rm[12, 1] Rm[2, 7] // dm[1, 2, 1]) Rm[8, 3] // dm[1, 3, 1]) Rm[4, 11] // dm[1, 4, 1])
      Rp[16, 5] // dm[1, 5, 1]) Rp[6, 13] // dm[1, 6, 1] // dm[1, 7, 1]
```

$\frac{T_1\,T_8+T_{16}-T_1\,T_{16}}{T_1\,T_8}$	h[1]	h[8]	h[11]	h[12]	h[13]	h[16]
t[1]	$-\frac{(-1+T_1)\,T_{16}^2}{T_1^2\,T_8^2\,T_{12}}$	0	$-\frac{(-1+T_1)\,T_{16}}{T_1^2}$	0	$\frac{-1+T_1}{T_1}$	0
t[8]	$-\frac{-1+T_8}{T_8\,T_{12}}$	0	$-\frac{(-1+T_1)^2\,(-1+T_8)\,T_{16}}{T_1^2\,T_8}$	0	$\frac{(-1+T_1)^2\,(-1+T_8)}{T_1\,T_8}$	0
t[12]	$-\frac{(-1+T_{12})\,(T_1\,T_8+T_{16}-T_1\,T_{16})}{T_1\,T_8\,T_{12}}$	0	0	0	0	0
t[16]	$\frac{-1+T_{16}}{T_8\,T_{12}}$	0	$\frac{(-1+T_1)\,(-1+T_{16})}{T_1}$	0	$-\frac{(-1+T_1)^2\,(-1+T_{16})}{T_1\,T_8}$	0
$1+\Sigma/\omega$	$\frac{T_{16}}{T_1\,T_8\,T_{12}}$	1	$\frac{1}{T_1}$	1	T_1	1

```
1 + Total[{{-1 + 1/T}, {-(-1 + T)^3/T^2}, {0}, {-2 + 1/T + T}}] / (1 / T) // Simplify
```

$$\left\{\frac{1}{T}\right\}$$

```
((((Rm[12, 1] Rm[2, 7] // dm[1, 2, 1]) Rm[8, 3] // dm[1, 3, 1]) Rm[4, 11] // dm[1, 4, 1])
      Rp[16, 5] // dm[1, 5, 1])
    Rp[6, 13] // dm[1, 6, 1] // dm[1, 7, 1] // dm[11, 12, 11]
```

$\frac{T_1\,T_8+T_{16}-T_1\,T_{16}}{T_1\,T_8}$	h[1]	h[8]	h[11]	h[13]	h[16]
t[1]	$-\frac{(-1+T_1)\,T_{16}^2}{T_1^2\,T_8^2\,T_{11}}$	0	$-\frac{(-1+T_1)\,T_{16}}{T_1^2}$	$\frac{-1+T_1}{T_1}$	0
t[8]	$-\frac{-1+T_8}{T_8\,T_{11}}$	0	$-\frac{(-1+T_1)^2\,(-1+T_8)\,T_{16}}{T_1^2\,T_8}$	$\frac{(-1+T_1)^2\,(-1+T_8)}{T_1\,T_8}$	0
t[11]	$-\frac{(-1+T_{11})\,(T_1\,T_8+T_{16}-T_1\,T_{16})}{T_1\,T_8\,T_{11}}$	0	0	0	0
t[16]	$\frac{-1+T_{16}}{T_8\,T_{11}}$	0	$\frac{(-1+T_1)\,(-1+T_{16})}{T_1}$	$-\frac{(-1+T_1)^2\,(-1+T_{16})}{T_1\,T_8}$	0
$1+\Sigma/\omega$	$\frac{T_{16}}{T_1\,T_8\,T_{11}}$	1	$\frac{1}{T_1}$	T_1	1

```
t29 =
 ((((Rm[12, 1] Rm[2, 7] // dm[1, 2, 1]) Rm[8, 3] // dm[1, 3, 1]) Rm[4, 11] // dm[1, 4, 1])
         Rp[16, 5] // dm[1, 5, 1]) Rp[6, 13] //
     dm[1, 6, 1] // dm[1, 7, 1] // dm[11, 12, 11] // dm[11, 13, 11]
```

$$\begin{pmatrix} \frac{T_1 T_8+T_{16}-T_1 T_{16}}{T_1 T_8} & h[1] & h[8] & h[11] & h[16] \\ t[1] & \frac{(-1+T_1)\left(-T_1 T_8^2+T_1 T_8^2 T_{11}-T_{16}^2\right)}{T_1^2 T_8^2 T_{11}} & 0 & -\frac{(-1+T_1)(-1+T_{16})}{T_1^2} & 0 \\ t[8] & \frac{(-1+T_8)\left(-1+T_1-T_1^2+T_{11}-2T_1T_{11}+T_1^2T_{11}\right)}{T_1 T_8 T_{11}} & 0 & -\frac{(-1+T_1)^2(-1+T_8)(-1+T_{16})}{T_1^2 T_8} & 0 \\ t[11] & -\frac{(-1+T_{11})(T_1 T_8+T_{16}-T_1 T_{16})}{T_8 T_{11}} & 0 & 0 & 0 \\ t[16] & -\frac{\left(-1+T_1-T_1^2+T_{11}-2T_1T_{11}+T_1^2T_{11}\right)(-1+T_{16})}{T_1 T_8 T_{11}} & 0 & \frac{(-1+T_1)(1-T_1+T_1T_8)(-1+T_{16})}{T_1^2 T_8} & 0 \\ 1+\Sigma/\omega & \frac{T_{16}}{T_1 T_8 T_{11}} & 1 & 1 & 1 \end{pmatrix}$$

```
Collect[t29[[3]] /. t[_] → 1, _h, Expand]
```

$$h[1]\left(-1+\frac{T_{16}}{T_8}-\frac{T_{16}}{T_1 T_8}+\frac{T_{16}}{T_1 T_8 T_{11}}+\frac{T_{16}^2}{T_1^2 T_8^2 T_{11}}-\frac{T_{16}^2}{T_1 T_8^2 T_{11}}\right)$$

```
((((Rm[12, 1] Rm[2, 7] // dm[1, 2, 1]) Rm[8, 3] // dm[1, 3, 1]) Rm[4, 11] // dm[1, 4, 1])
         Rp[16, 5] // dm[1, 5, 1]) Rp[6, 13] // dm[1, 6, 1] //
     dm[1, 7, 1] // dm[11, 12, 11] // dm[11, 13, 11] // dm[1, 8, 1]
```

$$\begin{pmatrix} \frac{T_1^2+T_{16}-T_1 T_{16}}{T_1^2} & h[1] & h[11] & h[16] \\ t[1] & \frac{(-1+T_1)\left(-T_1^2-T_1^4+T_1^2T_{11}-T_1^3T_{11}+T_1^4T_{11}-T_{16}^2\right)}{T_1^4 T_{11}} & -\frac{(-1+T_1)\left(1-T_1+T_1^2\right)(-1+T_{16})}{T_1^3} & 0 \\ t[11] & -\frac{(-1+T_{11})\left(T_1^2+T_{16}-T_1 T_{16}\right)}{T_1 T_{11}} & 0 & 0 \\ t[16] & -\frac{\left(-1+T_1-T_1^2+T_{11}-2T_1T_{11}+T_1^2T_{11}\right)(-1+T_{16})}{T_1^2 T_{11}} & \frac{(-1+T_1)\left(1-T_1+T_1^2\right)(-1+T_{16})}{T_1^3} & 0 \\ 1+\Sigma/\omega & \frac{T_{16}}{T_1^2 T_{11}} & 1 & 1 \end{pmatrix}$$

```
(((((Rm[12, 1] Rm[2, 7] // dm[1, 2, 1]) Rm[8, 3] // dm[1, 3, 1]) Rm[4, 11] // dm[1, 4, 1])
           Rp[16, 5] // dm[1, 5, 1]) Rp[6, 13] // dm[1, 6, 1] // dm[1, 7, 1] //
     dm[11, 12, 11] // dm[11, 13, 11] // dm[1, 8, 1]) Rp[14, 9]
```

$$\begin{pmatrix} \frac{T_1^2+T_{16}-T_1 T_{16}}{T_1^2} & h[1] & h[9] & h[11] & h[14] & h[16] \\ t[1] & \frac{(-1+T_1)\left(-T_1^2-T_1^4+T_1^2T_{11}-T_1^3T_{11}+T_1^4T_{11}-T_{16}^2\right)}{T_1^4 T_{11}} & 0 & -\frac{(-1+T_1)\left(1-T_1+T_1^2\right)(-1+T_{16})}{T_1^3} & 0 & 0 \\ t[11] & -\frac{(-1+T_{11})\left(T_1^2+T_{16}-T_1 T_{16}\right)}{T_1 T_{11}} & 0 & 0 & 0 & 0 \\ t[14] & 0 & \frac{(-1+T_{14})\left(T_1^2+T_{16}-T_1 T_{16}\right)}{T_1^2} & 0 & 0 & 0 \\ t[16] & -\frac{\left(-1+T_1-T_1^2+T_{11}-2T_1T_{11}+T_1^2T_{11}\right)(-1+T_{16})}{T_1^2 T_{11}} & 0 & \frac{(-1+T_1)\left(1-T_1+T_1^2\right)(-1+T_{16})}{T_1^3} & 0 & 0 \\ 1+\Sigma/\omega & \frac{T_{16}}{T_1^2 T_{11}} & T_{14} & 1 & 1 & 1 \end{pmatrix}$$

```
t33 =
 (((((Rm[12, 1] Rm[2, 7] // dm[1, 2, 1]) Rm[8, 3] // dm[1, 3, 1]) Rm[4, 11] // dm[1, 4, 1])
                Rp[16, 5] // dm[1, 5, 1]) Rp[6, 13] // dm[1, 6, 1] //
          dm[1, 7, 1] // dm[11, 12, 11] // dm[11, 13, 11] // dm[1, 8, 1])
     Rp[14, 9] // dm[11, 14, 11] // dm[1, 9, 1]
```

	h[1]	h[11]	h[16]
$\frac{T_1^2+T_{16}-T_1 T_{16}}{T_1^2}$			
t[1]	$\frac{(-1+T_1)\left(-T_1^2-T_1^4+T_1^2 T_{11}-T_1^3 T_{11}+T_1^4 T_{11}-T_{16}^2\right)}{T_1^4}$	$-\frac{(-1+T_1)\left(1-T_1+T_1^2\right) T_{11}\,(-1+T_{16})}{T_1^3}$	0
t[11]	$-\frac{\left(1-T_1+T_1^2\right)(-1+T_{11})(1-T_{11}+T_1 T_{11}-T_{16})}{T_1^2 T_{11}}$	$\frac{(-1+T_1)\left(1-T_1+T_1^2\right)(-1+T_{11})(-1+T_{16})}{T_1^3}$	0
t[16]	$-\frac{\left(-1+T_1-T_1^2+T_{11}-2 T_1 T_{11}+T_1^2 T_{11}\right)(-1+T_{16})}{T_1^2 T_{11}}$	$\frac{(-1+T_1)\left(1-T_1+T_1^2\right)(-1+T_{16})}{T_1^3}$	0
$1+\Sigma/\omega$	$\frac{T_{16}}{T_1^2}$	1	1

```
Collect[t33[[3]] /. t[_] → 1, _h, Expand]
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$$h[1]\left(-1+\frac{T_{16}}{T_1}+\frac{T_{16}^2}{T_1^4}-\frac{T_{16}^2}{T_1^3}\right)$$

```
((((((Rm[12, 1] Rm[2, 7] // dm[1, 2, 1]) Rm[8, 3] // dm[1, 3, 1]) Rm[4, 11] // dm[1, 4, 1])
                  Rp[16, 5] // dm[1, 5, 1]) Rp[6, 13] // dm[1, 6, 1] //
            dm[1, 7, 1] // dm[11, 12, 11] // dm[11, 13, 11] // dm[1, 8, 1])
       Rp[14, 9] // dm[11, 14, 11] // dm[1, 9, 1]) Rp[10, 15]
```

	h[1]	h[10]	h[11]	h[15]
$\frac{T_1^2+T_{16}-T_1 T_{16}}{T_1^2}$				
t[1]	$\frac{(-1+T_1)\left(-T_1^2-T_1^4+T_1^2 T_{11}-T_1^3 T_{11}+T_1^4 T_{11}-T_{16}^2\right)}{T_1^4}$	0	$-\frac{(-1+T_1)\left(1-T_1+T_1^2\right) T_{11}\,(-1+T_{16})}{T_1^3}$	0
t[10]	0	0	0	$\frac{(-1+T_{10})\left(T_1^2+T_{16}-T_1 T_{16}\right)}{T_1^2}$
t[11]	$-\frac{\left(1-T_1+T_1^2\right)(-1+T_{11})(1-T_{11}+T_1 T_{11}-T_{16})}{T_1^2 T_{11}}$	0	$\frac{(-1+T_1)\left(1-T_1+T_1^2\right)(-1+T_{11})(-1+T_{16})}{T_1^3}$	0
t[16]	$-\frac{\left(-1+T_1-T_1^2+T_{11}-2 T_1 T_{11}+T_1^2 T_{11}\right)(-1+T_{16})}{T_1^2 T_{11}}$	0	$\frac{(-1+T_1)\left(1-T_1+T_1^2\right)(-1+T_{16})}{T_1^3}$	0
$1+\Sigma/\omega$	$\frac{T_{16}}{T_1^2}$	1	1	T_{10}

```
((((((Rm[12, 1] Rm[2, 7] // dm[1, 2, 1]) Rm[8, 3] // dm[1, 3, 1]) Rm[4, 11] // dm[1, 4, 1])
                    Rp[16, 5] // dm[1, 5, 1]) Rp[6, 13] // dm[1, 6, 1] // dm[1, 7, 1] //
              dm[11, 12, 11] // dm[11, 13, 11] // dm[1, 8, 1]) Rp[14, 9] //
        dm[11, 14, 11] // dm[1, 9, 1]) Rp[10, 15] // dm[1, 10, 1]
```

	h[1]	h[11]	h[15]	h[16]
$\frac{T_1^2+T_{16}-T_1 T_{16}}{T_1^2}$				
t[1]	$\frac{(-1+T_1)\left(-T_1^2-T_1^4+T_1^2 T_{11}-T_1^3 T_{11}+T_1^4 T_{11}-T_{16}^2\right)}{T_1^4}$	$-\frac{(-1+T_1)\left(1-T_1+T_1^2\right) T_{11}\,(-1+T_{16})}{T_1^3}$	$\frac{(-1+T_1)\left(T_1^2+T_{16}-T_1 T_{16}\right)}{T_1^2}$	0
t[11]	$-\frac{\left(1-T_1+T_1^2\right)(-1+T_{11})(1-T_{11}+T_1 T_{11}-T_{16})}{T_1^2 T_{11}}$	$\frac{(-1+T_1)\left(1-T_1+T_1^2\right)(-1+T_{11})(-1+T_{16})}{T_1^3}$	0	0
t[16]	$-\frac{\left(-1+T_1-T_1^2+T_{11}-2 T_1 T_{11}+T_1^2 T_{11}\right)(-1+T_{16})}{T_1^2 T_{11}}$	$\frac{(-1+T_1)\left(1-T_1+T_1^2\right)(-1+T_{16})}{T_1^3}$	0	0
$1+\Sigma/\omega$	$\frac{T_{16}}{T_1^2}$	1	T_1	1

```
((((((Rm[12, 1] Rm[2, 7] // dm[1, 2, 1]) Rm[8, 3] // dm[1, 3, 1]) Rm[4, 11] // dm[1, 4, 1])
                    Rp[16, 5] // dm[1, 5, 1]) Rp[6, 13] // dm[1, 6, 1] // dm[1, 7, 1] //
              dm[11, 12, 11] // dm[11, 13, 11] // dm[1, 8, 1]) Rp[14, 9] //
        dm[11, 14, 11] // dm[1, 9, 1]) Rp[10, 15] // dm[1, 10, 1] // dm[11, 15, 11]
```

$$\begin{pmatrix} \frac{T_1^2+T_{16}-T_1 T_{16}}{T_1^2} & h[1] \\ t[1] & \frac{(-1+T_1)\left(-T_1^2+T_1^3-T_1^4+T_1^2 T_{11}-3 T_1^3 T_{11}+2 T_1^4 T_{11}-T_1^5 T_{11}+T_1^3 T_{11}^2-T_1^4 T_{11}^2+T_1^5 T_{11}^2+T_1^2 T_{16}-T_1^3 T_{16}+T_1^4 T_{16}-T_1^2 T_{11} T_{16}+T_1^3 T_{11} T_{16}-T_1^4 T_{11} T_{16}-T\right.}{T_1^4 T_{11}} \\ t[11] & -\frac{\left(1-T_1+T_1^2\right)(-1+T_{11})(1-T_{11}+T_1 T_{11}-T_{16})}{T_1 T_{11}} \\ t[16] & -\frac{\left(-1+T_1-T_1^2+T_{11}-2 T_1 T_{11}+T_1^2 T_{11}\right)(-1+T_{16})}{T_1^2 T_{11}} \\ 1+\Sigma/\omega & \frac{T_{16}}{T_1^2} \end{pmatrix}$$

```
((((((Rm[12, 1] Rm[2, 7] // dm[1, 2, 1]) Rm[8, 3] // dm[1, 3, 1]) Rm[4, 11] // dm[1, 4, 1])
                    Rp[16, 5] // dm[1, 5, 1]) Rp[6, 13] // dm[1, 6, 1] //
              dm[1, 7, 1] // dm[11, 12, 11] // dm[11, 13, 11] // dm[1, 8, 1])
        Rp[14, 9] // dm[11, 14, 11] // dm[1, 9, 1]) Rp[10, 15] //
   dm[1, 10, 1] // dm[11, 15, 11] // dm[11, 16, 11]
```

$$\begin{pmatrix} \frac{T_1^2+T_{11}-T_1 T_{11}}{T_1^2} & h[1] \\ t[1] & \frac{(-1+T_1)\left(-T_1^2+T_1^3-T_1^4+2 T_1^2 T_{11}-4 T_1^3 T_{11}+3 T_1^4 T_{11}-T_1^5 T_{11}-T_1^2 T_{11}^2+2 T_1^3 T_{11}^2-2 T_1^4 T_{11}^2+T_1^5 T_{11}^2-T_{11}^3\right)}{T_1^4 T_{11}} \quad -\frac{(-1+T_1)\left(-1+2 T_1-2 T_1^2+T_{11}-4 T_1\right.}{} \\ t[11] & -\frac{(-1+T_{11})\left(-1+2 T_1-2 T_1^2+T_1^3+T_{11}-4 T_1 T_{11}+4 T_1^2 T_{11}-3 T_1^3 T_{11}+T_1^4 T_{11}\right)}{T_1^2 T_{11}} \quad \frac{(-1+T_1)\left(1-T_1+T\right.}{} \\ 1+\Sigma/\omega & \frac{T_{11}}{T_1^2} \end{pmatrix}$$

```
t40 =
 ((((((Rm[12, 1] Rm[2, 7] // dm[1, 2, 1]) Rm[8, 3] // dm[1, 3, 1]) Rm[4, 11] // dm[1, 4,
                        1]) Rp[16, 5] // dm[1, 5, 1]) Rp[6, 13] // dm[1, 6, 1] // dm[
                  1, 7, 1] // dm[11, 12, 11] // dm[11, 13, 11] // dm[1, 8, 1])
            Rp[14, 9] // dm[11, 14, 11] // dm[1, 9, 1]) Rp[10, 15] //
      dm[1, 10, 1] // dm[11, 15, 11] // dm[11, 16, 11] // dm[1, 11, 1]
```

$$\begin{pmatrix} -\frac{1-4 T_1+8 T_1^2-11 T_1^3+8 T_1^4-4 T_1^5+T_1^6}{T_1^3} & h[1] \\ t[1] & 0 \\ 1+\Sigma/\omega & 1 \end{pmatrix}$$