

```

SetDirectory["C:\\drorbn\\AcademicPensieve\\2012-05"];
<< KnotTheory`
<< bbCalculus.m

```

Loading KnotTheory` version of August 22, 2010, 13:36:57.55.
Read more at <http://katlas.org/wiki/KnotTheory>.

```
b = Rp[2, 3] ** Rp[1, 3] ** Rp[1, 2] ** Rm[2, 1] ** Rp[3, 2]
```

$$\begin{pmatrix}
1 & h[1] & h[2] & h[3] \\
t[1] & 0 & \frac{-1+T_1}{T_2} & \frac{-1+T_1}{T_2} \\
t[2] & \left(-1 + \frac{1}{T_2}\right) T_3 & (1-T_1) \left(-1 + \frac{1}{T_2}\right) T_3 & \frac{(-1+T_2) (-1+T_1) (1+T_2) T_3}{T_2} \\
t[3] & \left(1 - \frac{1}{T_2}\right) (-1+T_3) & \frac{(-1+T_1+T_2) (-1+T_3)}{T_2} & \frac{(1-T_2) (-1+T_1) (1+T_2) (-1+T_3)}{T_2} \\
1+\Sigma/\omega & \frac{1}{T_2} & T_1 T_3 & T_1 T_2
\end{pmatrix}$$

```
CT1[B[ω_, σ_, μ_]] := Simplify[ω (σ - Total[h /@ hL[σ]]) == (μ /. _t → 1)]
```

```
CT1[b]
```

```
True
```

```

CT2[B[ω_, _, μ_]] := Module[
  {μ1, tails, heads, mat},
  μ1 = μ /. T_ → T;
  {tails, heads} = {tL[μ1], hL[μ1]};
  If[Length[tails] < 2 || Length[heads] < 2, True,
    mat = Outer[{∂t[#1], h[#2] μ1} &, tL[μ1], hL[μ1]];
    And @@ ((1 == Denominator[Factor[T1000 # / ω])) & /@ Flatten[Minors[mat, 2]])
  ]
]

```

```
CT2[b]
```

```
True
```

```
BB@@b /. T_ → T
```

$$\begin{aligned}
& BB \left[1, \frac{h[1]}{T} + T^2 h[2] + T^2 h[3], h[1] \left(\left(-1 + \frac{1}{T} \right) T t[2] + \left(1 - \frac{1}{T} \right) (-1+T) t[3] \right) + \right. \\
& h[2] \left(\frac{(-1+T) t[1]}{T} + \left(-1 + \frac{1}{T} \right) (1-T) T t[2] + \frac{(-1+T) (-1+2T) t[3]}{T} \right) + \\
& \left. h[3] \left(\frac{(-1+T) t[1]}{T} + (-1+T) (-1+T) (1+T) t[2] + \frac{(1-T) (-1+T) (-1+T) (1+T) t[3]}{T} \right) \right]
\end{aligned}$$

```

CT2[
  B[T - 2,  $\frac{h[1]}{T} + T^2 h[2] + T^2 h[3]$ , h[1]  $\left( \left( -1 + \frac{1}{T} \right) T t[2] + \left( 1 - \frac{1}{T} \right) (-1 + T) t[3] \right) +$ 
  h[2]  $\left( \frac{(-1 + T) t[1]}{T} + \left( -1 + \frac{1}{T} \right) (1 - T) T t[2] + \frac{(-1 + T) (-1 + 2 T) t[3]}{T} \right) +$ 
  h[3]  $\left( \frac{(-1 + T) t[1]}{T} + (-1 + T) (-1 + T (1 + T)) t[2] + \frac{(1 - T) (-1 + T) (-1 + T (1 + T)) t[3]}{T} \right) ]$ 
```

```
1 == -2 + T && 1 == -2 + T && 1 == -2 + T &&
```

```
1 == -2 + T && 1 == -2 + T && 1 == -2 + T && 1 == -2 + T && 1 == -2 + T
```

```
CT[b_B] := CT1[b] && CT2[b]
```

```

CT[
  B[T - 2,  $\frac{h[1]}{T} + T^2 h[2] + T^2 h[3]$ , h[1]  $\left( \left( -1 + \frac{1}{T} \right) T t[2] + \left( 1 - \frac{1}{T} \right) (-1 + T) t[3] \right) +$ 
  h[2]  $\left( \frac{(-1 + T) t[1]}{T} + \left( -1 + \frac{1}{T} \right) (1 - T) T t[2] + \frac{(-1 + T) (-1 + 2 T) t[3]}{T} \right) +$ 
  h[3]  $\left( \frac{(-1 + T) t[1]}{T} + (-1 + T) (-1 + T (1 + T)) t[2] + \frac{(1 - T) (-1 + T) (-1 + T (1 + T)) t[3]}{T} \right) ]$ 
```

```


$$\frac{(3 - 4 T + T^2) (-h[1] + T (1 + T) (h[2] + h[3]))}{T} = 0 \&\& 1 == -2 + T \&\& 1 == -2 + T \&\&$$


```

```
1 == -2 + T && 1 == -2 + T && 1 == -2 + T && 1 == -2 + T && 1 == -2 + T && 1 == -2 + T
```

```
CT[b]
```

```
True
```

```

Test[K_] := Module[
  {b, ok},
  b = Times@@ (PD[K] /.
    X[i_, j_, k_, l_] => If[PositiveQ[X[i, j, k, l]], Rp[l, i], Rm[j, i]]);
  b = b /. T_ -> T;
  ok = CT2[b];
  Do[b = dm[l, k, 1][b]; ok = ok && CT2[b], {k, 2, 2 Crossings[K]}];
  {ok, b[[1]], Alexander[K][T]}
]

```

```
Test[Knot[10, 165]]
```

```
{True,  $T^2 (-2 + 10 T - 15 T^2 + 10 T^3 - 2 T^4)$ ,  $-15 - \frac{2}{T^2} + \frac{10}{T} + 10 T - 2 T^2$ }
```

```
(# -> Test[#][[1]]) & /@ AllKnots[7]
```

```
{Knot[7, 1] -> True, Knot[7, 2] -> True, Knot[7, 3] -> True,
```

```
Knot[7, 4] -> True, Knot[7, 5] -> True, Knot[7, 6] -> True, Knot[7, 7] -> True}
```

```

Analyze[K_] := Module[
  {b, ok},
  b = Times@@ (PD[K] /.
    X[i_, j_, k_, l_] => If[PositiveQ[X[i, j, k, l]], Rp[l, i], Rm[j, i]]);
  b = b /. T_ -> T;
  ok = CT2[b];
  Do[
    b = dm[1, k, 1][b];
    ok = ok && CT2[b];
    Print[{k, b, ok}],
    {k, 2, 2 Crossings[K]};
  {ok, b[[1]], Alexander[K][T]}
]

False && Analyze[Knot[7, 7]]

False

CT3[B[ω_, _, μ_]] := Module[
  {μ1, tails, heads, mat},
  μ1 = μ /. T_ -> T;
  {tails, heads} = {tL[μ1], hL[μ1]};
  If[Length[tails] < 3 || Length[heads] < 3, True,
    mat = Outer[(∂t[#1], h[#2] μ1) &, tL[μ1], hL[μ1]];
    And @@ ((1 == Denominator[Factor[T1000 #/ω2]]) & /@ Flatten[Minors[mat, 3]])
  ]
]

```

```

bbSimplify = Expand[Factor[#]] && n = 10;
b = Product[If[Random[] < 1/2, Rp[i, i], Rm[i, i]], {i, n}];
b = b /. T_ -> T;
ts = hs = Range[n];
Print[β[k = 0] = b];
While[CT3[b] && Length[ts] + Length[hs] > 2,
  i = ts[[RandomInteger[{1, Length[ts]}]]];
  j = hs[[RandomInteger[{1, Length[hs]}]]];
  r = Random[];
  Which[
    (r == 0.6) < 0, (
      Print[{"++k", {ts, hs}, "swaph", {i, j}}];
      Print[β[k] = b = b // swaph[i, j]]
    ),
    (r == 0.2) < 0, (
      j = ts[[RandomInteger[{1, Length[ts]}]]];
      If[i ≠ j,
        Print[{"++k", {ts, hs}, "tm", {i, j, i}}];
        Print[β[k] = b = b // tm[i, j, i]];
        ts = DeleteCases[ts, j]
      ]
    ),
    True, (
      i = hs[[RandomInteger[{1, Length[hs]}]]];
      If[i ≠ j,
        Print[{"++k", {ts, hs}, "hm", {i, j, i}}];
        Print[β[k] = b = b // hm[i, j, i]];
        hs = DeleteCases[hs, j]
      ]
    )
  ]
];
{CT2[b], b}

```

	1	h[1]	h[2]	h[3]	h[4]	h[5]	h[6]	h[7]	h[8]	h[9]	h[10]
t[1]	-1 + $\frac{1}{T}$	0	0	0	0	0	0	0	0	0	0
t[2]	0	-1 + $\frac{1}{T}$	0	0	0	0	0	0	0	0	0
t[3]	0	0	-1 + T	0	0	0	0	0	0	0	0
t[4]	0	0	0	-1 + T	0	0	0	0	0	0	0
t[5]	0	0	0	0	-1 + T	0	0	0	0	0	0
t[6]	0	0	0	0	0	-1 + $\frac{1}{T}$	0	0	0	0	0
t[7]	0	0	0	0	0	0	-1 + T	0	0	0	0
t[8]	0	0	0	0	0	0	0	-1 + $\frac{1}{T}$	0	0	0
t[9]	0	0	0	0	0	0	0	0	-1 + T	0	0
t[10]	0	0	0	0	0	0	0	0	0	-1 + $\frac{1}{T}$	0
1+Σ/ω	$\frac{1}{T}$	$\frac{1}{T}$	T	T	T	$\frac{1}{T}$	T	$\frac{1}{T}$	T	$\frac{1}{T}$	$\frac{1}{T}$

```

{1, {{1, 2, 3, 4, 5, 6, 7, 8, 9, 10}, {1, 2, 3, 4, 5, 6, 7, 8, 9, 10}}, swaph, {2, 2}}

```

$$\begin{pmatrix} \frac{1}{T} & h[1] & h[2] & h[3] & h[4] & h[5] & h[6] & h[7] & h[8] & h[9] & h[10] \\ t[1] & \frac{1}{T^2} - \frac{1}{T} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ t[2] & 0 & \frac{1}{T^2} - \frac{1}{T} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ t[3] & 0 & 0 & 1 - \frac{1}{T} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ t[4] & 0 & 0 & 0 & 1 - \frac{1}{T} & 0 & 0 & 0 & 0 & 0 & 0 \\ t[5] & 0 & 0 & 0 & 0 & 1 - \frac{1}{T} & 0 & 0 & 0 & 0 & 0 \\ t[6] & 0 & 0 & 0 & 0 & 0 & \frac{1}{T^2} - \frac{1}{T} & 0 & 0 & 0 & 0 \\ t[7] & 0 & 0 & 0 & 0 & 0 & 0 & 1 - \frac{1}{T} & 0 & 0 & 0 \\ t[8] & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{T^2} - \frac{1}{T} & 0 & 0 \\ t[9] & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 - \frac{1}{T} & 0 \\ t[10] & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{T^2} - \frac{1}{T} \\ 1+\Sigma/\omega & \frac{1}{T} & \frac{1}{T} & T & T & T & \frac{1}{T} & T & \frac{1}{T} & T & \frac{1}{T} \end{pmatrix}$$

{2, {{1, 2, 3, 4, 5, 6, 7, 8, 9, 10}, {1, 2, 3, 4, 5, 6, 7, 8, 9, 10}}, swaph, {7, 2}}

$$\begin{pmatrix} \frac{1}{T} & h[1] & h[2] & h[3] & h[4] & h[5] & h[6] & h[7] & h[8] & h[9] & h[10] \\ t[1] & \frac{1}{T^2} - \frac{1}{T} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ t[2] & 0 & \frac{1}{T^2} - \frac{1}{T} & 0 & 0 & 0 & 0 & 1 + \frac{1}{T^2} - \frac{2}{T} & 0 & 0 & 0 \\ t[3] & 0 & 0 & 1 - \frac{1}{T} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ t[4] & 0 & 0 & 0 & 1 - \frac{1}{T} & 0 & 0 & 0 & 0 & 0 & 0 \\ t[5] & 0 & 0 & 0 & 0 & 1 - \frac{1}{T} & 0 & 0 & 0 & 0 & 0 \\ t[6] & 0 & 0 & 0 & 0 & 0 & \frac{1}{T^2} - \frac{1}{T} & 0 & 0 & 0 & 0 \\ t[7] & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{T^2} + \frac{1}{T} & 0 & 0 & 0 \\ t[8] & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{T^2} - \frac{1}{T} & 0 & 0 \\ t[9] & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 - \frac{1}{T} & 0 \\ t[10] & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{T^2} - \frac{1}{T} \\ 1+\Sigma/\omega & \frac{1}{T} & \frac{1}{T} & T & T & T & \frac{1}{T} & T & \frac{1}{T} & T & \frac{1}{T} \end{pmatrix}$$

{3, {{1, 2, 3, 4, 5, 6, 7, 8, 9, 10}, {1, 2, 3, 4, 5, 6, 7, 8, 9, 10}}, swaph, {9, 3}}

$$\begin{pmatrix}
\frac{1}{T} & h[1] & h[2] & h[3] & h[4] & h[5] & h[6] & h[7] & h[8] & h[9] & h[10] \\
t[1] & \frac{1}{T^2} - \frac{1}{T} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
t[2] & 0 & \frac{1}{T^2} - \frac{1}{T} & 0 & 0 & 0 & 0 & 1 + \frac{1}{T^2} - \frac{2}{T} & 0 & 0 & 0 \\
t[3] & 0 & 0 & 1 - \frac{1}{T} & 0 & 0 & 0 & 0 & 0 & 2 - \frac{1}{T} - T & 0 \\
t[4] & 0 & 0 & 0 & 1 - \frac{1}{T} & 0 & 0 & 0 & 0 & 0 & 0 \\
t[5] & 0 & 0 & 0 & 0 & 1 - \frac{1}{T} & 0 & 0 & 0 & 0 & 0 \\
t[6] & 0 & 0 & 0 & 0 & 0 & \frac{1}{T^2} - \frac{1}{T} & 0 & 0 & 0 & 0 \\
t[7] & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{T^2} + \frac{1}{T} & 0 & 0 & 0 \\
t[8] & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{T^2} - \frac{1}{T} & 0 & 0 \\
t[9] & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 + T & 0 \\
t[10] & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{T^2} - \frac{1}{T} \\
1+\Sigma/\omega & \frac{1}{T} & \frac{1}{T} & T & T & T & \frac{1}{T} & T & \frac{1}{T} & T & \frac{1}{T}
\end{pmatrix}$$

{4, {{1, 2, 3, 4, 5, 6, 7, 8, 9, 10}, {1, 2, 3, 4, 5, 6, 7, 8, 9, 10}}, hm, {10, 1, 10}}

$$\begin{pmatrix}
\frac{1}{T} & h[2] & h[3] & h[4] & h[5] & h[6] & h[7] & h[8] & h[9] & h[10] \\
t[1] & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{T^3} - \frac{1}{T^2} \\
t[2] & \frac{1}{T^2} - \frac{1}{T} & 0 & 0 & 0 & 0 & 1 + \frac{1}{T^2} - \frac{2}{T} & 0 & 0 & 0 \\
t[3] & 0 & 1 - \frac{1}{T} & 0 & 0 & 0 & 0 & 0 & 2 - \frac{1}{T} - T & 0 \\
t[4] & 0 & 0 & 1 - \frac{1}{T} & 0 & 0 & 0 & 0 & 0 & 0 \\
t[5] & 0 & 0 & 0 & 1 - \frac{1}{T} & 0 & 0 & 0 & 0 & 0 \\
t[6] & 0 & 0 & 0 & 0 & \frac{1}{T^2} - \frac{1}{T} & 0 & 0 & 0 & 0 \\
t[7] & 0 & 0 & 0 & 0 & 0 & -\frac{1}{T^2} + \frac{1}{T} & 0 & 0 & 0 \\
t[8] & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{T^2} - \frac{1}{T} & 0 & 0 \\
t[9] & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 + T & 0 \\
t[10] & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{T^2} - \frac{1}{T} \\
1+\Sigma/\omega & \frac{1}{T} & T & T & T & \frac{1}{T} & T & \frac{1}{T} & T & \frac{1}{T^2}
\end{pmatrix}$$

{5, {{1, 2, 3, 4, 5, 6, 7, 8, 9, 10}, {2, 3, 4, 5, 6, 7, 8, 9, 10}}, hm, {7, 9, 7}}

$$\begin{pmatrix} \frac{1}{T} & h[2] & h[3] & h[4] & h[5] & h[6] & h[7] & h[8] & h[10] \\ t[1] & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{T^3} - \frac{1}{T^2} \\ t[2] & \frac{1}{T^2} - \frac{1}{T} & 0 & 0 & 0 & 0 & 1 + \frac{1}{T^2} - \frac{2}{T} & 0 & 0 \\ t[3] & 0 & 1 - \frac{1}{T} & 0 & 0 & 0 & -1 + 2T - T^2 & 0 & 0 \\ t[4] & 0 & 0 & 1 - \frac{1}{T} & 0 & 0 & 0 & 0 & 0 \\ t[5] & 0 & 0 & 0 & 1 - \frac{1}{T} & 0 & 0 & 0 & 0 \\ t[6] & 0 & 0 & 0 & 0 & \frac{1}{T^2} - \frac{1}{T} & 0 & 0 & 0 \\ t[7] & 0 & 0 & 0 & 0 & 0 & -\frac{1}{T^2} + \frac{1}{T} & 0 & 0 \\ t[8] & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{T^2} - \frac{1}{T} & 0 \\ t[9] & 0 & 0 & 0 & 0 & 0 & -T + T^2 & 0 & 0 \\ t[10] & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{T^2} - \frac{1}{T} \\ 1+\Sigma/\omega & \frac{1}{T} & T & T & T & \frac{1}{T} & T^2 & \frac{1}{T} & \frac{1}{T^2} \end{pmatrix}$$

{6, {{1, 2, 3, 4, 5, 6, 7, 8, 9, 10}, {2, 3, 4, 5, 6, 7, 8, 10}}, hm, {4, 8, 4}}

$$\begin{pmatrix} \frac{1}{T} & h[2] & h[3] & h[4] & h[5] & h[6] & h[7] & h[10] \\ t[1] & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{T^3} - \frac{1}{T^2} \\ t[2] & \frac{1}{T^2} - \frac{1}{T} & 0 & 0 & 0 & 0 & 1 + \frac{1}{T^2} - \frac{2}{T} & 0 \\ t[3] & 0 & 1 - \frac{1}{T} & 0 & 0 & 0 & -1 + 2T - T^2 & 0 \\ t[4] & 0 & 0 & 1 - \frac{1}{T} & 0 & 0 & 0 & 0 \\ t[5] & 0 & 0 & 0 & 1 - \frac{1}{T} & 0 & 0 & 0 \\ t[6] & 0 & 0 & 0 & 0 & \frac{1}{T^2} - \frac{1}{T} & 0 & 0 \\ t[7] & 0 & 0 & 0 & 0 & 0 & -\frac{1}{T^2} + \frac{1}{T} & 0 \\ t[8] & 0 & 0 & -1 + \frac{1}{T} & 0 & 0 & 0 & 0 \\ t[9] & 0 & 0 & 0 & 0 & 0 & -T + T^2 & 0 \\ t[10] & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{T^2} - \frac{1}{T} \\ 1+\Sigma/\omega & \frac{1}{T} & T & 1 & T & \frac{1}{T} & T^2 & \frac{1}{T^2} \end{pmatrix}$$

{7, {{1, 2, 3, 4, 5, 6, 7, 8, 9, 10}, {2, 3, 4, 5, 6, 7, 10}}, tm, {10, 4, 10}}

$$\begin{pmatrix} \frac{1}{T} & h[2] & h[3] & h[4] & h[5] & h[6] & h[7] & h[10] \\ t[1] & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{T^3} - \frac{1}{T^2} \\ t[2] & \frac{1}{T^2} - \frac{1}{T} & 0 & 0 & 0 & 0 & 1 + \frac{1}{T^2} - \frac{2}{T} & 0 \\ t[3] & 0 & 1 - \frac{1}{T} & 0 & 0 & 0 & -1 + 2T - T^2 & 0 \\ t[5] & 0 & 0 & 0 & 1 - \frac{1}{T} & 0 & 0 & 0 \\ t[6] & 0 & 0 & 0 & 0 & \frac{1}{T^2} - \frac{1}{T} & 0 & 0 \\ t[7] & 0 & 0 & 0 & 0 & 0 & -\frac{1}{T^2} + \frac{1}{T} & 0 \\ t[8] & 0 & 0 & -1 + \frac{1}{T} & 0 & 0 & 0 & 0 \\ t[9] & 0 & 0 & 0 & 0 & 0 & -T + T^2 & 0 \\ t[10] & 0 & 0 & 1 - \frac{1}{T} & 0 & 0 & 0 & \frac{1}{T^2} - \frac{1}{T} \\ 1+\Sigma/\omega & \frac{1}{T} & T & 1 & T & \frac{1}{T} & T^2 & \frac{1}{T^2} \end{pmatrix}$$

{8, {{1, 2, 3, 5, 6, 7, 8, 9, 10}, {2, 3, 4, 5, 6, 7, 10}}, swaph, {10, 6}}

$$\left(\begin{array}{c} \frac{1}{T} \quad h[2] \quad h[3] \quad h[4] \quad h[5] \quad h[6] \quad h[7] \quad h[10] \\ t[1] \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad \frac{1}{T^3} - \frac{1}{T^2} \\ t[2] \quad \frac{1}{T^2} - \frac{1}{T} \quad 0 \quad 0 \quad 0 \quad 0 \quad 1 + \frac{1}{T^2} - \frac{2}{T} \quad 0 \\ t[3] \quad 0 \quad 1 - \frac{1}{T} \quad 0 \quad 0 \quad 0 \quad -1 + 2T - T^2 \quad 0 \\ t[5] \quad 0 \quad 0 \quad 0 \quad 1 - \frac{1}{T} \quad 0 \quad 0 \quad 0 \\ t[6] \quad 0 \quad 0 \quad 1 + \frac{1}{T^2} - \frac{2}{T} \quad 0 \quad \frac{1}{T^2} - \frac{1}{T} \quad 0 \quad -\frac{1}{T^3} + \frac{2}{T^2} - \frac{1}{T} \\ t[7] \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{1}{T^2} + \frac{1}{T} \quad 0 \\ t[8] \quad 0 \quad 0 \quad -1 + \frac{1}{T} \quad 0 \quad 0 \quad 0 \quad 0 \\ t[9] \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -T + T^2 \quad 0 \\ t[10] \quad 0 \quad 0 \quad -\frac{1}{T^2} + \frac{1}{T} \quad 0 \quad 0 \quad 0 \quad \frac{1}{T^3} - \frac{1}{T^2} \\ 1+\Sigma/\omega \quad \frac{1}{T} \quad T \quad 1 \quad T \quad \frac{1}{T} \quad T^2 \quad \frac{1}{T^2} \end{array} \right)$$

{9, {{1, 2, 3, 5, 6, 7, 8, 9, 10}, {2, 3, 4, 5, 6, 7, 10}}, hm, {2, 10, 2}}

$$\left(\begin{array}{c} \frac{1}{T} \quad h[2] \quad h[3] \quad h[4] \quad h[5] \quad h[6] \quad h[7] \\ t[1] \quad \frac{1}{T^4} - \frac{1}{T^3} \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \\ t[2] \quad \frac{1}{T^2} - \frac{1}{T} \quad 0 \quad 0 \quad 0 \quad 0 \quad 1 + \frac{1}{T^2} - \frac{2}{T} \\ t[3] \quad 0 \quad 1 - \frac{1}{T} \quad 0 \quad 0 \quad 0 \quad -1 + 2T - T^2 \\ t[5] \quad 0 \quad 0 \quad 0 \quad 1 - \frac{1}{T} \quad 0 \quad 0 \\ t[6] \quad -\frac{1}{T^4} + \frac{2}{T^3} - \frac{1}{T^2} \quad 0 \quad 1 + \frac{1}{T^2} - \frac{2}{T} \quad 0 \quad \frac{1}{T^2} - \frac{1}{T} \quad 0 \\ t[7] \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{1}{T^2} + \frac{1}{T} \\ t[8] \quad 0 \quad 0 \quad -1 + \frac{1}{T} \quad 0 \quad 0 \quad 0 \\ t[9] \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad -T + T^2 \\ t[10] \quad \frac{1}{T^4} - \frac{1}{T^3} \quad 0 \quad -\frac{1}{T^2} + \frac{1}{T} \quad 0 \quad 0 \quad 0 \\ 1+\Sigma/\omega \quad \frac{1}{T^3} \quad T \quad 1 \quad T \quad \frac{1}{T} \quad T^2 \end{array} \right)$$

{10, {{1, 2, 3, 5, 6, 7, 8, 9, 10}, {2, 3, 4, 5, 6, 7}}, hm, {2, 4, 2}}

$$\left(\begin{array}{c} \frac{1}{T} \quad h[2] \quad h[3] \quad h[5] \quad h[6] \quad h[7] \\ t[1] \quad \frac{1}{T^4} - \frac{1}{T^3} \quad 0 \quad 0 \quad 0 \quad 0 \\ t[2] \quad \frac{1}{T^2} - \frac{1}{T} \quad 0 \quad 0 \quad 0 \quad 1 + \frac{1}{T^2} - \frac{2}{T} \\ t[3] \quad 0 \quad 1 - \frac{1}{T} \quad 0 \quad 0 \quad -1 + 2T - T^2 \\ t[5] \quad 0 \quad 0 \quad 1 - \frac{1}{T} \quad 0 \quad 0 \\ t[6] \quad \frac{1}{T^5} - \frac{3}{T^4} + \frac{3}{T^3} - \frac{1}{T^2} \quad 0 \quad 0 \quad \frac{1}{T^2} - \frac{1}{T} \quad 0 \\ t[7] \quad 0 \quad 0 \quad 0 \quad 0 \quad -\frac{1}{T^2} + \frac{1}{T} \\ t[8] \quad \frac{1}{T^4} - \frac{1}{T^3} \quad 0 \quad 0 \quad 0 \quad 0 \\ t[9] \quad 0 \quad 0 \quad 0 \quad 0 \quad -T + T^2 \\ t[10] \quad -\frac{1}{T^5} + \frac{2}{T^4} - \frac{1}{T^3} \quad 0 \quad 0 \quad 0 \quad 0 \\ 1+\Sigma/\omega \quad \frac{1}{T^3} \quad T \quad T \quad \frac{1}{T} \quad T^2 \end{array} \right)$$

{11, {{1, 2, 3, 5, 6, 7, 8, 9, 10}, {2, 3, 5, 6, 7}}, swaph, {8, 2}}

$$\begin{pmatrix}
\frac{1}{T^4} - \frac{1}{T^3} + \frac{1}{T} & h[2] & h[3] & h[5] & h[6] & h[7] \\
t[1] & \frac{1}{T^4} - \frac{1}{T^3} & 0 & 0 & 0 & 0 \\
t[2] & \frac{1}{T^2} - \frac{1}{T} & 0 & 0 & 0 & 1 + \frac{1}{T^5} - \frac{3}{T^4} + \\
t[3] & 0 & 1 - \frac{1}{T^4} + \frac{2}{T^3} - \frac{1}{T^2} - \frac{1}{T} & 0 & 0 & -\frac{1}{T^3} + \frac{3}{T^2} - \frac{3}{T} + \\
t[5] & 0 & 0 & 1 - \frac{1}{T^4} + \frac{2}{T^3} - \frac{1}{T^2} - \frac{1}{T} & 0 & 0 \\
t[6] & \frac{1}{T^5} - \frac{3}{T^4} + \frac{3}{T^3} - \frac{1}{T^2} & 0 & 0 & \frac{1}{T^5} - \frac{2}{T^4} + \frac{1}{T^3} + \frac{1}{T^2} - \frac{1}{T} & 0 \\
t[7] & 0 & 0 & 0 & 0 & -\frac{1}{T^5} + \frac{2}{T^4} - \frac{1}{T^3} \\
t[8] & \frac{1}{T^7} - \frac{1}{T^6} & 0 & 0 & 0 & 0 \\
t[9] & 0 & 0 & 0 & 0 & -1 - \frac{1}{T^2} + \frac{2}{T} \\
t[10] & -\frac{1}{T^5} + \frac{2}{T^4} - \frac{1}{T^3} & 0 & 0 & 0 & 0 \\
1+\Sigma/\omega & \frac{1}{T^3} & T & T & \frac{1}{T} & T^2
\end{pmatrix}$$

{12, {{1, 2, 3, 5, 6, 7, 8, 9, 10}}, {2, 3, 5, 6, 7}}, tm, {7, 3, 7}}

$$\begin{pmatrix}
\frac{1}{T^4} - \frac{1}{T^3} + \frac{1}{T} & h[2] & h[3] & h[5] & h[6] & h \\
t[1] & \frac{1}{T^4} - \frac{1}{T^3} & 0 & 0 & 0 & \\
t[2] & \frac{1}{T^2} - \frac{1}{T} & 0 & 0 & 0 & 1 + \frac{1}{T^5} - \\
t[5] & 0 & 0 & 1 - \frac{1}{T^4} + \frac{2}{T^3} - \frac{1}{T^2} - \frac{1}{T} & 0 & \\
t[6] & \frac{1}{T^5} - \frac{3}{T^4} + \frac{3}{T^3} - \frac{1}{T^2} & 0 & 0 & \frac{1}{T^5} - \frac{2}{T^4} + \frac{1}{T^3} + \frac{1}{T^2} - \frac{1}{T} & \\
t[7] & 0 & 1 - \frac{1}{T^4} + \frac{2}{T^3} - \frac{1}{T^2} - \frac{1}{T} & 0 & 0 & -\frac{1}{T^5} + \frac{2}{T^4} - \frac{2}{T^3} \\
t[8] & \frac{1}{T^7} - \frac{1}{T^6} & 0 & 0 & 0 & \\
t[9] & 0 & 0 & 0 & 0 & -1 - \frac{1}{T^2} \\
t[10] & -\frac{1}{T^5} + \frac{2}{T^4} - \frac{1}{T^3} & 0 & 0 & 0 & \\
1+\Sigma/\omega & \frac{1}{T^3} & T & T & \frac{1}{T} &
\end{pmatrix}$$

{13, {{1, 2, 5, 6, 7, 8, 9, 10}}, {2, 3, 5, 6, 7}}, swaph, {7, 2}}

$$\begin{pmatrix}
\frac{1}{T^4} - \frac{1}{T^3} + \frac{1}{T} & h[2] & h[3] & h[5] & h[6] & \\
t[1] & \frac{1}{T^4} - \frac{1}{T^3} & \frac{1}{T^4} - \frac{2}{T^3} + \frac{1}{T^2} & 0 & 0 & -1 + \frac{1}{T^5} \\
t[2] & \frac{1}{T^2} - \frac{1}{T} & 1 + \frac{1}{T^2} - \frac{2}{T} & 0 & 0 & -2 + \frac{1}{T^5} - \\
t[5] & 0 & 0 & 1 - \frac{1}{T^4} + \frac{2}{T^3} - \frac{1}{T^2} - \frac{1}{T} & 0 & \\
t[6] & \frac{1}{T^5} - \frac{3}{T^4} + \frac{3}{T^3} - \frac{1}{T^2} & \frac{1}{T^5} - \frac{4}{T^4} + \frac{6}{T^3} - \frac{4}{T^2} + \frac{1}{T} & 0 & \frac{1}{T^5} - \frac{2}{T^4} + \frac{1}{T^3} + \frac{1}{T^2} - \frac{1}{T} & 5 + \frac{1}{T^5} - \frac{4}{T^5} \\
t[7] & 0 & -\frac{1}{T^7} + \frac{2}{T^6} - \frac{1}{T^5} - \frac{1}{T^4} + \frac{1}{T^3} & 0 & 0 & -\frac{1}{T^8} + \frac{2}{T^7} - \\
t[8] & \frac{1}{T^7} - \frac{1}{T^6} & \frac{1}{T^7} - \frac{2}{T^6} + \frac{1}{T^5} & 0 & 0 & \frac{1}{T^8} - \frac{2}{T^7} \\
t[9] & 0 & 0 & 0 & 0 & -1 - \\
t[10] & -\frac{1}{T^5} + \frac{2}{T^4} - \frac{1}{T^3} & -\frac{1}{T^5} + \frac{3}{T^4} - \frac{3}{T^3} + \frac{1}{T^2} & 0 & 0 & -1 - \frac{1}{T^6} + \\
1+\Sigma/\omega & \frac{1}{T^3} & T & T & \frac{1}{T} &
\end{pmatrix}$$

{14, {{1, 2, 5, 6, 7, 8, 9, 10}}, {2, 3, 5, 6, 7}}, swaph, {5, 7}}

$$\begin{pmatrix}
\frac{1}{T^4} - \frac{1}{T^3} + \frac{1}{T} & h[2] & h[3] & h[5] & h[6] \\
t[1] & \frac{1}{T^4} - \frac{1}{T^3} & \frac{1}{T^4} - \frac{2}{T^3} + \frac{1}{T^2} & -4 + \frac{1}{T^5} - \frac{3}{T^4} + \frac{4}{T^3} - \frac{5}{T^2} + \frac{6}{T} + T & 0 \\
t[2] & \frac{1}{T^2} - \frac{1}{T} & 1 + \frac{1}{T^2} - \frac{2}{T} & -2 + \frac{1}{T^5} - \frac{4}{T^4} + \frac{7}{T^3} - \frac{6}{T^2} + \frac{2}{T} + 5T - 4T^2 + T^3 & 0 \\
t[5] & 0 & 0 & -1 - \frac{1}{T^2} + \frac{2}{T} - T + T^2 & 0 \\
t[6] & \frac{1}{T^5} - \frac{3}{T^4} + \frac{3}{T^3} - \frac{1}{T^2} & \frac{1}{T^5} - \frac{4}{T^4} + \frac{6}{T^3} - \frac{4}{T^2} + \frac{1}{T} & 15 + \frac{1}{T^6} - \frac{5}{T^5} + \frac{11}{T^4} - \frac{16}{T^3} + \frac{20}{T^2} - \frac{21}{T} - 6T + T^2 & \frac{1}{T^5} - \frac{2}{T^4} + \frac{1}{T} \\
t[7] & 0 & -\frac{1}{T^7} + \frac{2}{T^6} - \frac{1}{T^5} - \frac{1}{T^4} + \frac{1}{T^3} & 1 - \frac{1}{T^8} + \frac{3}{T^7} - \frac{4}{T^6} + \frac{4}{T^5} - \frac{4}{T^4} + \frac{2}{T^3} + \frac{2}{T^2} - \frac{3}{T} & 0 \\
t[8] & \frac{1}{T^7} - \frac{1}{T^6} & \frac{1}{T^7} - \frac{2}{T^6} + \frac{1}{T^5} & \frac{1}{T^8} - \frac{3}{T^7} + \frac{4}{T^6} - \frac{5}{T^5} + \frac{6}{T^4} - \frac{4}{T^3} + \frac{1}{T^2} & 0 \\
t[9] & 0 & 0 & -3 - \frac{1}{T^2} + \frac{3}{T} + 2T^2 - T^3 & 0 \\
t[10] & -\frac{1}{T^5} + \frac{2}{T^4} - \frac{1}{T^3} & -\frac{1}{T^5} + \frac{3}{T^4} - \frac{3}{T^3} + \frac{1}{T^2} & -5 - \frac{1}{T^6} + \frac{4}{T^5} - \frac{7}{T^4} + \frac{9}{T^3} - \frac{11}{T^2} + \frac{10}{T} + T & 0 \\
1+\Sigma/\omega & \frac{1}{T^3} & T & T & \frac{1}{T}
\end{pmatrix}$$

{15, {{1, 2, 5, 6, 7, 8, 9, 10}, {2, 3, 5, 6, 7}}, tm, {2, 5, 2}}

$$\begin{pmatrix}
\frac{1}{T^4} - \frac{1}{T^3} + \frac{1}{T} & h[2] & h[3] & h[5] & h[6] \\
t[1] & \frac{1}{T^4} - \frac{1}{T^3} & \frac{1}{T^4} - \frac{2}{T^3} + \frac{1}{T^2} & -4 + \frac{1}{T^5} - \frac{3}{T^4} + \frac{4}{T^3} - \frac{5}{T^2} + \frac{6}{T} + T & 0 \\
t[2] & \frac{1}{T^2} - \frac{1}{T} & 1 + \frac{1}{T^2} - \frac{2}{T} & -3 + \frac{1}{T^5} - \frac{4}{T^4} + \frac{7}{T^3} - \frac{7}{T^2} + \frac{4}{T} + 4T - 3T^2 + T^3 & 0 \\
t[6] & \frac{1}{T^5} - \frac{3}{T^4} + \frac{3}{T^3} - \frac{1}{T^2} & \frac{1}{T^5} - \frac{4}{T^4} + \frac{6}{T^3} - \frac{4}{T^2} + \frac{1}{T} & 15 + \frac{1}{T^6} - \frac{5}{T^5} + \frac{11}{T^4} - \frac{16}{T^3} + \frac{20}{T^2} - \frac{21}{T} - 6T + T^2 & \frac{1}{T^5} - \frac{2}{T^4} + \frac{1}{T} \\
t[7] & 0 & -\frac{1}{T^7} + \frac{2}{T^6} - \frac{1}{T^5} - \frac{1}{T^4} + \frac{1}{T^3} & 1 - \frac{1}{T^8} + \frac{3}{T^7} - \frac{4}{T^6} + \frac{4}{T^5} - \frac{4}{T^4} + \frac{2}{T^3} + \frac{2}{T^2} - \frac{3}{T} & 0 \\
t[8] & \frac{1}{T^7} - \frac{1}{T^6} & \frac{1}{T^7} - \frac{2}{T^6} + \frac{1}{T^5} & \frac{1}{T^8} - \frac{3}{T^7} + \frac{4}{T^6} - \frac{5}{T^5} + \frac{6}{T^4} - \frac{4}{T^3} + \frac{1}{T^2} & 0 \\
t[9] & 0 & 0 & -3 - \frac{1}{T^2} + \frac{3}{T} + 2T^2 - T^3 & 0 \\
t[10] & -\frac{1}{T^5} + \frac{2}{T^4} - \frac{1}{T^3} & -\frac{1}{T^5} + \frac{3}{T^4} - \frac{3}{T^3} + \frac{1}{T^2} & -5 - \frac{1}{T^6} + \frac{4}{T^5} - \frac{7}{T^4} + \frac{9}{T^3} - \frac{11}{T^2} + \frac{10}{T} + T & 0 \\
1+\Sigma/\omega & \frac{1}{T^3} & T & T & \frac{1}{T}
\end{pmatrix}$$

{16, {{1, 2, 6, 7, 8, 9, 10}, {2, 3, 5, 6, 7}}, swaph, {6, 6}}

$$\begin{pmatrix}
\frac{1}{T^5} - \frac{1}{T^4} + \frac{1}{T^2} & h[2] & h[3] & h[5] & h[6] \\
t[1] & \frac{1}{T^5} - \frac{1}{T^4} & \frac{1}{T^5} - \frac{2}{T^4} + \frac{1}{T^3} & 1 + \frac{1}{T^6} - \frac{3}{T^5} + \frac{4}{T^4} - \frac{5}{T^3} + \frac{6}{T^2} - \frac{4}{T} & 0 \\
t[2] & \frac{1}{T^3} - \frac{1}{T^2} & \frac{1}{T^3} - \frac{2}{T^2} + \frac{1}{T} & 4 + \frac{1}{T^6} - \frac{4}{T^5} + \frac{7}{T^4} - \frac{7}{T^3} + \frac{4}{T^2} - \frac{3}{T} - 3T + T^2 & 0 \\
t[6] & \frac{1}{T^6} - \frac{3}{T^5} + \frac{3}{T^4} - \frac{1}{T^3} & \frac{1}{T^6} - \frac{4}{T^5} + \frac{6}{T^4} - \frac{4}{T^3} + \frac{1}{T^2} & -6 + \frac{1}{T^7} - \frac{5}{T^6} + \frac{11}{T^5} - \frac{16}{T^4} + \frac{20}{T^3} - \frac{21}{T^2} + \frac{15}{T} + T & \frac{1}{T^6} - \frac{2}{T^5} + \frac{1}{T} \\
t[7] & 0 & -\frac{1}{T^8} + \frac{2}{T^7} - \frac{1}{T^6} - \frac{1}{T^5} + \frac{1}{T^4} & -\frac{1}{T^9} + \frac{3}{T^8} - \frac{4}{T^7} + \frac{4}{T^6} - \frac{4}{T^5} + \frac{2}{T^4} + \frac{2}{T^3} - \frac{3}{T^2} + \frac{1}{T} & 0 \\
t[8] & \frac{1}{T^8} - \frac{1}{T^7} & \frac{1}{T^8} - \frac{2}{T^7} + \frac{1}{T^6} & \frac{1}{T^9} - \frac{3}{T^8} + \frac{4}{T^7} - \frac{5}{T^6} + \frac{6}{T^5} - \frac{4}{T^4} + \frac{1}{T^3} & 0 \\
t[9] & 0 & 0 & -\frac{1}{T^3} + \frac{3}{T^2} - \frac{3}{T} + 2T - T^2 & 0 \\
t[10] & -\frac{1}{T^6} + \frac{2}{T^5} - \frac{1}{T^4} & -\frac{1}{T^6} + \frac{3}{T^5} - \frac{3}{T^4} + \frac{1}{T^3} & 1 - \frac{1}{T^7} + \frac{4}{T^6} - \frac{7}{T^5} + \frac{9}{T^4} - \frac{11}{T^3} + \frac{10}{T^2} - \frac{5}{T} & 0 \\
1+\Sigma/\omega & \frac{1}{T^3} & T & T & \frac{1}{T}
\end{pmatrix}$$

{17, {{1, 2, 6, 7, 8, 9, 10}, {2, 3, 5, 6, 7}}, swaph, {10, 3}}

$$\left(\begin{array}{l}
 -\frac{1}{T^6} + \frac{4}{T^5} - \frac{4}{T^4} + \frac{1}{T^3} + \frac{1}{T^2} \\
 t[1] \\
 t[2] \\
 t[6] \\
 t[7] \\
 t[8] \\
 t[9] \\
 t[10] \\
 1+\Sigma/\omega
 \end{array} \right) \begin{array}{ccc}
 h[2] & h[3] & h[5] \\
 \frac{1}{T^5} - \frac{1}{T^4} & \frac{1}{T^5} - \frac{2}{T^4} + \frac{1}{T^3} & 1 + \frac{1}{T^6} - \frac{3}{T^5} + \frac{4}{T^4} - \frac{5}{T^3} + \frac{6}{T^2} - \frac{4}{T} \\
 \frac{1}{T^3} - \frac{1}{T^2} & \frac{1}{T^3} - \frac{2}{T^2} + \frac{1}{T} & 5 - \frac{1}{T^7} + \frac{7}{T^6} - \frac{19}{T^5} + \frac{28}{T^4} - \frac{26}{T^3} + \frac{16}{T^2} - \frac{8}{T} - 3T \\
 \frac{1}{T^6} - \frac{3}{T^5} + \frac{3}{T^4} - \frac{1}{T^3} & \frac{1}{T^6} - \frac{4}{T^5} + \frac{6}{T^4} - \frac{4}{T^3} + \frac{1}{T^2} & -6 + \frac{1}{T^7} - \frac{5}{T^6} + \frac{11}{T^5} - \frac{16}{T^4} + \frac{20}{T^3} - \frac{21}{T^2} + \frac{15}{T} + \\
 -\frac{1}{T^9} + \frac{3}{T^8} - \frac{3}{T^7} + \frac{1}{T^6} & -\frac{1}{T^8} + \frac{2}{T^7} - \frac{1}{T^6} - \frac{1}{T^5} + \frac{1}{T^4} & -\frac{1}{T^9} + \frac{3}{T^8} - \frac{4}{T^7} + \frac{4}{T^6} - \frac{4}{T^5} + \frac{2}{T^4} + \frac{2}{T^3} - \frac{3}{T^2} + \\
 \frac{1}{T^8} - \frac{1}{T^7} & \frac{1}{T^8} - \frac{2}{T^7} + \frac{1}{T^6} & \frac{1}{T^9} - \frac{3}{T^8} + \frac{4}{T^7} - \frac{5}{T^6} + \frac{6}{T^5} - \frac{4}{T^4} + \frac{1}{T^3} \\
 0 & 0 & 5 + \frac{1}{T^4} - \frac{6}{T^3} + \frac{13}{T^2} - \frac{13}{T} + T - T^2 \\
 -\frac{1}{T^5} + \frac{2}{T^4} - \frac{1}{T^3} & -\frac{1}{T^5} + \frac{3}{T^4} - \frac{3}{T^3} + \frac{1}{T^2} & -5 - \frac{1}{T^6} + \frac{4}{T^5} - \frac{7}{T^4} + \frac{9}{T^3} - \frac{11}{T^2} + \frac{10}{T} + T \\
 \frac{1}{T^3} & T & T
 \end{array}$$

{18, {{1, 2, 6, 7, 8, 9, 10}, {2, 3, 5, 6, 7}}, swaph, {6, 7}}

$$\left(\begin{array}{l}
 -1 + \frac{1}{T^7} - \frac{5}{T^6} + \frac{11}{T^5} - \frac{13}{T^4} + \frac{12}{T^3} - \frac{9}{T^2} + \frac{5}{T} \\
 t[1] \\
 t[2] \\
 t[6] \\
 t[7] \\
 t[8] \\
 t[9] \\
 t[10] \\
 1+\Sigma/\omega
 \end{array} \right) \begin{array}{ccc}
 h[2] & h[3] & \\
 \frac{1}{T^5} - \frac{1}{T^4} & \frac{1}{T^5} - \frac{2}{T^4} + \frac{1}{T^3} & \\
 -\frac{1}{T^7} + \frac{5}{T^6} - \frac{10}{T^5} + \frac{10}{T^4} - \frac{4}{T^3} & -\frac{1}{T^7} + \frac{6}{T^6} - \frac{15}{T^5} + \frac{20}{T^4} - \frac{14}{T^3} + \frac{4}{T^2} & 26 \\
 \frac{1}{T^4} - \frac{3}{T^3} + \frac{3}{T^2} - \frac{1}{T} & 1 + \frac{1}{T^4} - \frac{4}{T^3} + \frac{6}{T^2} - \frac{4}{T} & \\
 \frac{1}{T^{10}} - \frac{5}{T^9} + \frac{10}{T^8} - \frac{12}{T^7} + \frac{12}{T^6} - \frac{10}{T^5} + \frac{5}{T^4} - \frac{1}{T^3} & -\frac{1}{T^8} + \frac{2}{T^7} - \frac{1}{T^6} - \frac{1}{T^5} + \frac{1}{T^4} & \\
 \frac{1}{T^8} - \frac{1}{T^7} & \frac{1}{T^8} - \frac{2}{T^7} + \frac{1}{T^6} & \\
 1 + \frac{1}{T^4} - \frac{4}{T^3} + \frac{6}{T^2} - \frac{4}{T} & 5 + \frac{1}{T^4} - \frac{5}{T^3} + \frac{10}{T^2} - \frac{10}{T} - T & \\
 -\frac{1}{T^5} + \frac{2}{T^4} - \frac{1}{T^3} & -\frac{1}{T^5} + \frac{3}{T^4} - \frac{3}{T^3} + \frac{1}{T^2} & \\
 \frac{1}{T^3} & T &
 \end{array}$$

{19, {{1, 2, 6, 7, 8, 9, 10}, {2, 3, 5, 6, 7}}, swaph, {1, 7}}

$$\left(\begin{array}{l}
 -1 + \frac{1}{T^7} - \frac{4}{T^6} + \frac{9}{T^5} - \frac{11}{T^4} + \frac{9}{T^3} - \frac{6}{T^2} + \frac{4}{T} \\
 t[1] \\
 t[2] \\
 t[6] \\
 t[7] \\
 t[8] \\
 t[9] \\
 t[10] \\
 1+\Sigma/\omega
 \end{array} \right) \begin{array}{ccc}
 h[2] & h[3] & \\
 \frac{1}{T^3} - \frac{1}{T^2} & \frac{1}{T^3} - \frac{2}{T^2} + \frac{1}{T} & \\
 -\frac{1}{T^7} + \frac{4}{T^6} - \frac{7}{T^5} + \frac{7}{T^4} - \frac{3}{T^3} & -\frac{1}{T^7} + \frac{5}{T^6} - \frac{11}{T^5} + \frac{14}{T^4} - \frac{10}{T^3} + \frac{3}{T^2} & 20 \\
 \frac{1}{T^4} - \frac{3}{T^3} + \frac{3}{T^2} - \frac{1}{T} & 1 + \frac{1}{T^4} - \frac{4}{T^3} + \frac{6}{T^2} - \frac{4}{T} & \\
 \frac{1}{T^{10}} - \frac{4}{T^9} + \frac{8}{T^8} - \frac{10}{T^7} + \frac{9}{T^6} - \frac{7}{T^5} + \frac{4}{T^4} - \frac{1}{T^3} & -\frac{1}{T^8} + \frac{2}{T^7} - \frac{1}{T^6} - \frac{1}{T^5} + \frac{1}{T^4} & \\
 \frac{1}{T^8} - \frac{1}{T^7} & \frac{1}{T^8} - \frac{2}{T^7} + \frac{1}{T^6} & \\
 1 + \frac{1}{T^4} - \frac{3}{T^3} + \frac{4}{T^2} - \frac{3}{T} & 4 + \frac{1}{T^4} - \frac{4}{T^3} + \frac{7}{T^2} - \frac{7}{T} - T & \\
 -\frac{1}{T^5} + \frac{2}{T^4} - \frac{1}{T^3} & -\frac{1}{T^5} + \frac{3}{T^4} - \frac{3}{T^3} + \frac{1}{T^2} & \\
 \frac{1}{T^3} & T &
 \end{array}$$

{20, {{1, 2, 6, 7, 8, 9, 10}, {2, 3, 5, 6, 7}}, swaph, {8, 2}}

$$\left(\begin{array}{l}
 -1 + \frac{1}{T^8} - \frac{4}{T^6} + \frac{9}{T^5} - \frac{11}{T^4} + \frac{9}{T^3} - \frac{6}{T^2} + \frac{4}{T} \\
 t[1] \\
 t[2] \\
 t[6] \\
 t[7] \\
 t[8] \\
 t[9] \\
 t[10] \\
 1 + \Sigma/\omega
 \end{array} \right) \begin{array}{l}
 h[2] \\
 \frac{1}{T^3} - \frac{1}{T^2} \\
 -\frac{1}{T^7} + \frac{4}{T^6} - \frac{7}{T^5} + \frac{7}{T^4} - \frac{3}{T^3} \\
 \frac{1}{T^4} - \frac{3}{T^3} + \frac{3}{T^2} - \frac{1}{T} \\
 \frac{1}{T^{10}} - \frac{4}{T^9} + \frac{8}{T^8} - \frac{10}{T^7} + \frac{9}{T^6} - \frac{7}{T^5} + \frac{4}{T^4} - \frac{1}{T^3} - \frac{1}{T^{11}} + \frac{2}{T^{10}} - \frac{1}{T^9} - \frac{1}{T^8} + \frac{2}{T^7} - \frac{1}{T^6} - \frac{1}{T^5} + \frac{1}{T^{11}} - \frac{1}{T^{10}} \\
 1 + \frac{1}{T^4} - \frac{3}{T^3} + \frac{4}{T^2} - \frac{3}{T} \\
 -\frac{1}{T^5} + \frac{2}{T^4} - \frac{1}{T^3} \\
 \frac{1}{T^3}
 \end{array} \begin{array}{l}
 h[3] \\
 \frac{1}{T^3} - \frac{2}{T^2} + \frac{1}{T} \\
 -\frac{1}{T^7} + \frac{5}{T^6} - \frac{11}{T^5} + \frac{14}{T^4} - \frac{10}{T^3} + \frac{3}{T^2} \\
 1 + \frac{1}{T^4} - \frac{4}{T^3} + \frac{6}{T^2} - \frac{4}{T} \\
 \frac{1}{T^{10}} - \frac{4}{T^9} + \frac{8}{T^8} - \frac{10}{T^7} + \frac{9}{T^6} - \frac{7}{T^5} + \frac{4}{T^4} - \frac{1}{T^3} - \frac{1}{T^{11}} + \frac{2}{T^{10}} - \frac{1}{T^9} - \frac{1}{T^8} + \frac{2}{T^7} - \frac{1}{T^6} - \frac{1}{T^5} + \frac{1}{T^{11}} - \frac{2}{T^{10}} + \frac{1}{T^9} \\
 4 + \frac{1}{T^4} - \frac{4}{T^3} + \frac{7}{T^2} - \frac{7}{T} - T \\
 -\frac{1}{T^5} + \frac{3}{T^4} - \frac{3}{T^3} + \frac{1}{T^2} \\
 T
 \end{array}$$

{21, {{1, 2, 6, 7, 8, 9, 10}, {2, 3, 5, 6, 7}}, swaph, {8, 5}}

$$\left(\begin{array}{l}
 -1 + \frac{1}{T^{12}} - \frac{3}{T^{11}} + \frac{4}{T^{10}} - \frac{5}{T^9} + \frac{7}{T^8} - \frac{4}{T^7} - \frac{3}{T^6} + \frac{9}{T^5} - \frac{11}{T^4} + \frac{9}{T^3} - \frac{6}{T^2} + \frac{4}{T} \\
 t[1] \\
 t[2] \\
 t[6] \\
 t[7] \\
 t[8] \\
 t[9] \\
 t[10] \\
 1 + \Sigma/\omega
 \end{array} \right) \begin{array}{l}
 h[2] \\
 \frac{1}{T^3} - \frac{1}{T^2} \\
 -\frac{1}{T^{12}} + \frac{4}{T^{11}} - \frac{6}{T^{10}} + \frac{5}{T^9} - \frac{3}{T^8} + \frac{4}{T^6} - \frac{7}{T^5} + \frac{1}{T^4} \\
 \frac{1}{T^4} - \frac{3}{T^3} + \frac{3}{T^2} - \frac{1}{T} \\
 \frac{1}{T^{15}} - \frac{3}{T^{14}} + \frac{4}{T^{13}} - \frac{5}{T^{12}} + \frac{6}{T^{11}} - \frac{3}{T^{10}} - \frac{3}{T^9} + \frac{8}{T^8} - \frac{10}{T^7} + \frac{1}{T^6} - \frac{1}{T^9} \\
 1 + \frac{1}{T^9} - \frac{3}{T^8} + \frac{3}{T^7} - \frac{1}{T^6} + \frac{1}{T^4} - \frac{3}{T^3} + \frac{4}{T^2} \\
 -\frac{1}{T^5} + \frac{2}{T^4} - \frac{1}{T^3} \\
 \frac{1}{T^3}
 \end{array}$$

{22, {{1, 2, 6, 7, 8, 9, 10}, {2, 3, 5, 6, 7}}, tm, {10, 7, 10}}

$$\left(\begin{array}{l}
 -1 + \frac{1}{T^{12}} - \frac{3}{T^{11}} + \frac{4}{T^{10}} - \frac{5}{T^9} + \frac{7}{T^8} - \frac{4}{T^7} - \frac{3}{T^6} + \frac{9}{T^5} - \frac{11}{T^4} + \frac{9}{T^3} - \frac{6}{T^2} + \frac{4}{T} \\
 t[1] \\
 t[2] \\
 t[6] \\
 t[8] \\
 t[9] \\
 t[10] \\
 1 + \Sigma/\omega
 \end{array} \right) \begin{array}{l}
 h[2] \\
 \frac{1}{T^3} - \frac{1}{T^2} \\
 -\frac{1}{T^{12}} + \frac{4}{T^{11}} - \frac{6}{T^{10}} + \frac{5}{T^9} - \frac{3}{T^8} + \frac{4}{T^6} - \frac{7}{T^5} + \frac{1}{T^4} \\
 \frac{1}{T^4} - \frac{3}{T^3} + \frac{3}{T^2} - \frac{1}{T} \\
 \frac{1}{T^{10}} - \frac{1}{T^9} \\
 1 + \frac{1}{T^9} - \frac{3}{T^8} + \frac{3}{T^7} - \frac{1}{T^6} + \frac{1}{T^4} - \frac{3}{T^3} + \frac{4}{T^2} \\
 \frac{1}{T^{15}} - \frac{3}{T^{14}} + \frac{4}{T^{13}} - \frac{5}{T^{12}} + \frac{6}{T^{11}} - \frac{3}{T^{10}} - \frac{3}{T^9} + \frac{8}{T^8} - \frac{10}{T^7} + \frac{1}{T^6} - \frac{1}{T^9} \\
 \frac{1}{T^3}
 \end{array}$$

{23, {{1, 2, 6, 8, 9, 10}, {2, 3, 5, 6, 7}}, tm, {9, 1, 9}}

$$\left(\begin{array}{l} -1 + \frac{1}{T^{12}} - \frac{3}{T^{11}} + \frac{4}{T^{10}} - \frac{5}{T^9} + \frac{7}{T^8} - \frac{4}{T^7} - \frac{3}{T^6} + \frac{9}{T^5} - \frac{11}{T^4} + \frac{9}{T^3} - \frac{6}{T^2} + \frac{4}{T} \\ t[2] \\ t[6] \\ t[8] \\ t[9] \\ t[10] \\ 1+\Sigma/\omega \end{array} \right) \begin{array}{l} h[2] \\ -\frac{1}{T^{12}} + \frac{4}{T^{11}} - \frac{6}{T^{10}} + \frac{5}{T^9} - \frac{3}{T^8} + \frac{4}{T^6} - \frac{7}{T^5} + \frac{1}{T} \\ \frac{1}{T^4} - \frac{3}{T^3} + \frac{3}{T^2} - \frac{1}{T} \\ \frac{1}{T^{10}} - \frac{1}{T^9} \\ 1 + \frac{1}{T^9} - \frac{3}{T^8} + \frac{3}{T^7} - \frac{1}{T^6} + \frac{1}{T^4} - \frac{2}{T^3} + \frac{3}{T^2} \\ \frac{1}{T^{15}} - \frac{3}{T^{14}} + \frac{4}{T^{13}} - \frac{5}{T^{12}} + \frac{6}{T^{11}} - \frac{3}{T^{10}} - \frac{3}{T^9} + \frac{8}{T^8} - \frac{10}{T^7} + \frac{1}{T^6} \\ \frac{1}{T^3} \end{array}$$

{24, {{2, 6, 8, 9, 10}, {2, 3, 5, 6, 7}}, swaph, {9, 6}}

$$\left(\begin{array}{l} 2 + \frac{1}{T^{12}} - \frac{3}{T^{11}} + \frac{4}{T^{10}} - \frac{5}{T^9} + \frac{7}{T^8} - \frac{3}{T^7} - \frac{6}{T^6} + \frac{10}{T^5} - \frac{3}{T^4} - \frac{8}{T^3} + \frac{12}{T^2} - \frac{7}{T} \\ t[2] \\ t[6] \\ t[8] \\ t[9] \\ t[10] \\ 1+\Sigma/\omega \end{array} \right) \begin{array}{l} h[2] \\ 3 - \frac{1}{T^{12}} + \frac{4}{T^{11}} - \frac{6}{T^{10}} + \frac{5}{T^9} - \frac{2}{T^8} - \frac{4}{T^7} + \frac{10}{T^6} - \frac{10}{T^5} \\ -4 - \frac{1}{T^8} + \frac{4}{T^7} - \frac{6}{T^6} + \frac{4}{T^5} - \frac{3}{T^3} + \frac{1}{T} \\ \frac{1}{T^{10}} - \frac{3}{T^8} + \frac{3}{T^7} - \frac{1}{T^6} \\ \frac{1}{T^{10}} - \frac{3}{T^9} + \frac{3}{T^8} - \frac{1}{T^7} + \frac{1}{T^5} - \frac{2}{T^4} + \frac{1}{T} \\ -1 + \frac{1}{T^{15}} - \frac{3}{T^{14}} + \frac{4}{T^{13}} - \frac{5}{T^{12}} + \frac{6}{T^{11}} - \frac{3}{T^{10}} - \frac{3}{T^9} + \frac{6}{T^8} - \frac{2}{T^7} \\ \frac{1}{T^3} \end{array}$$

{25, {{2, 6, 8, 9, 10}, {2, 3, 5, 6, 7}}, swaph, {8, 6}}

$$\left(\begin{array}{l} 2 + \frac{1}{T^8} + \frac{1}{T^7} - \frac{7}{T^6} + \frac{10}{T^5} - \frac{3}{T^4} - \frac{8}{T^3} + \frac{12}{T^2} - \frac{7}{T} \\ t[2] \\ t[6] \\ t[8] \\ t[9] \\ t[10] \\ 1+\Sigma/\omega \end{array} \right) \begin{array}{l} h[2] \\ 3 + \frac{1}{T^9} - \frac{1}{T^8} - \frac{4}{T^7} + \frac{10}{T^6} - \frac{10}{T^5} + \frac{4}{T^4} + \frac{3}{T^3} - \frac{3}{T^2} - \frac{2}{T} - T \quad 5 + \frac{1}{T^9} - \frac{2}{T^8} - \frac{3}{T} \\ -4 - \frac{1}{T^9} + \frac{1}{T^8} + \frac{3}{T^7} - \frac{6}{T^6} + \frac{4}{T^5} - \frac{3}{T^3} + \frac{1}{T^2} + \frac{4}{T} + T \quad -8 - \frac{1}{T^9} + \frac{2}{T^8} + \frac{1}{T} \\ \frac{1}{T^{11}} - \frac{3}{T^9} + \frac{3}{T^8} - \frac{1}{T^7} \\ \frac{1}{T^5} - \frac{2}{T^4} + \frac{3}{T^3} - \frac{3}{T^2} + \frac{1}{T} \\ -1 + \frac{1}{T^{10}} - \frac{4}{T^9} + \frac{6}{T^8} - \frac{2}{T^7} - \frac{5}{T^6} + \frac{7}{T^5} - \frac{6}{T^4} + \frac{7}{T^3} - \frac{7}{T^2} + \frac{4}{T} \quad -5 - \frac{1}{T^{11}} + \frac{1}{T^{10}} + \frac{3}{T^9} \\ \frac{1}{T^3} \end{array}$$

{26, {{2, 6, 8, 9, 10}, {2, 3, 5, 6, 7}}, tm, {10, 6, 10}}

$$\left(\begin{array}{l} 2 + \frac{1}{T^8} + \frac{1}{T^7} - \frac{7}{T^6} + \frac{10}{T^5} - \frac{3}{T^4} - \frac{8}{T^3} + \frac{12}{T^2} - \frac{7}{T} \\ t[2] \\ t[8] \\ t[9] \\ t[10] \\ 1+\Sigma/\omega \end{array} \right) \begin{array}{l} h[2] \\ 3 + \frac{1}{T^9} - \frac{1}{T^8} - \frac{4}{T^7} + \frac{10}{T^6} - \frac{10}{T^5} + \frac{4}{T^4} + \frac{3}{T^3} - \frac{3}{T^2} - \frac{2}{T} - T \quad 5 + \frac{1}{T^9} \\ \frac{1}{T^{11}} - \frac{3}{T^9} + \frac{3}{T^8} - \frac{1}{T^7} \\ \frac{1}{T^5} - \frac{2}{T^4} + \frac{3}{T^3} - \frac{3}{T^2} + \frac{1}{T} \\ -5 + \frac{1}{T^{10}} - \frac{5}{T^9} + \frac{7}{T^8} + \frac{1}{T^7} - \frac{11}{T^6} + \frac{11}{T^5} - \frac{6}{T^4} + \frac{4}{T^3} - \frac{6}{T^2} + \frac{8}{T} + T \quad -13 - \frac{1}{T^{11}} + \frac{1}{T^{10}} \\ \frac{1}{T^3} \end{array}$$

{27, {{2, 8, 9, 10}, {2, 3, 5, 6, 7}}, tm, {2, 10, 2}}

$$\left(\begin{array}{l} 2 + \frac{1}{T^8} + \frac{1}{T^7} - \frac{7}{T^6} + \frac{10}{T^5} - \frac{3}{T^4} - \frac{8}{T^3} + \frac{12}{T^2} - \frac{7}{T} \\ t[2] \\ t[8] \\ t[9] \\ 1+\Sigma/\omega \end{array} \right) \begin{array}{l} h[2] \\ -2 + \frac{1}{T^{10}} - \frac{4}{T^9} + \frac{6}{T^8} - \frac{3}{T^7} - \frac{1}{T^6} + \frac{1}{T^5} - \frac{2}{T^4} + \frac{7}{T^3} - \frac{9}{T^2} + \frac{6}{T} - 8 - \frac{1}{T^{11}} + \frac{1}{T^{10}} + \frac{3}{T^5} \\ \frac{1}{T^{11}} - \frac{3}{T^9} + \frac{3}{T^8} - \frac{1}{T^7} \\ \frac{1}{T^5} - \frac{2}{T^4} + \frac{3}{T^3} - \frac{3}{T^2} + \frac{1}{T} \\ \frac{1}{T^3} \end{array}$$

{28, {{2, 8, 9}, {2, 3, 5, 6, 7}}, tm, {2, 8, 2}}

$$\left(\begin{array}{l} 2 + \frac{1}{T^8} + \frac{1}{T^7} - \frac{7}{T^6} + \frac{10}{T^5} - \frac{3}{T^4} - \frac{8}{T^3} + \frac{12}{T^2} - \frac{7}{T} \\ t[2] \\ t[9] \\ 1+\Sigma/\omega \end{array} \right) \begin{array}{l} h[2] \\ -2 + \frac{1}{T^{11}} + \frac{1}{T^{10}} - \frac{7}{T^9} + \frac{9}{T^8} - \frac{4}{T^7} - \frac{1}{T^6} + \frac{1}{T^5} - \frac{2}{T^4} + \frac{7}{T^3} - \frac{9}{T^2} + \frac{6}{T} - 8 - \frac{1}{T^8} + \frac{8}{T^6} \\ \frac{1}{T^5} - \frac{2}{T^4} + \frac{3}{T^3} - \frac{3}{T^2} + \frac{1}{T} \\ \frac{1}{T^3} \end{array}$$

{29, {{2, 9}, {2, 3, 5, 6, 7}}, swaph, {9, 7}}

$$\left(\begin{array}{l} 2 + \frac{1}{T^8} - \frac{5}{T^6} + \frac{11}{T^5} - \frac{10}{T^4} + \frac{2}{T^3} + \frac{4}{T^2} - \frac{4}{T} \\ t[2] \\ t[9] \\ 1+\Sigma/\omega \end{array} \right) \begin{array}{l} h[2] \\ 1 + \frac{1}{T^{11}} - \frac{5}{T^9} + \frac{10}{T^8} - \frac{10}{T^7} + \frac{7}{T^6} - \frac{7}{T^5} + \frac{6}{T^4} - \frac{1}{T^3} - \frac{2}{T^2} + \frac{1}{T} - T - \frac{1}{T^8} + \frac{1}{T^7} + \frac{5}{T^6} - \frac{16}{T^5} + \\ -3 + \frac{1}{T^3} - \frac{2}{T^2} + \frac{3}{T} + T \\ \frac{1}{T^3} \end{array}$$

{30, {{2, 9}, {2, 3, 5, 6, 7}}, hm, {6, 3, 6}}

$$\left(\begin{array}{l} 2 + \frac{1}{T^8} - \frac{5}{T^6} + \frac{11}{T^5} - \frac{10}{T^4} + \frac{2}{T^3} + \frac{4}{T^2} - \frac{4}{T} \\ t[2] \\ t[9] \\ 1+\Sigma/\omega \end{array} \right) \begin{array}{l} h[2] \\ 1 + \frac{1}{T^{11}} - \frac{5}{T^9} + \frac{10}{T^8} - \frac{10}{T^7} + \frac{7}{T^6} - \frac{7}{T^5} + \frac{6}{T^4} - \frac{1}{T^3} - \frac{2}{T^2} + \frac{1}{T} - T \quad 12 - \frac{1}{T^8} + \frac{1}{T^7} + \frac{5}{T^6} - \frac{1}{T^5} \\ -3 + \frac{1}{T^3} - \frac{2}{T^2} + \frac{3}{T} + T \\ \frac{1}{T^3} \end{array}$$

{31, {{2, 9}, {2, 5, 6, 7}}, hm, {6, 5, 6}}

$$\left(\begin{array}{l} 2 + \frac{1}{T^8} - \frac{5}{T^6} + \frac{11}{T^5} - \frac{10}{T^4} + \frac{2}{T^3} + \frac{4}{T^2} - \frac{4}{T} \\ t[2] \\ t[9] \\ 1+\Sigma/\omega \end{array} \right) \begin{array}{l} h[2] \\ 1 + \frac{1}{T^{11}} - \frac{5}{T^9} + \frac{10}{T^8} - \frac{10}{T^7} + \frac{7}{T^6} - \frac{7}{T^5} + \frac{6}{T^4} - \frac{1}{T^3} - \frac{2}{T^2} + \frac{1}{T} - T \quad 19 - \frac{1}{T^8} + \frac{1}{T^7} + \frac{4}{T^6} - \frac{1}{T^5} \\ -3 + \frac{1}{T^3} - \frac{2}{T^2} + \frac{3}{T} + T \\ \frac{1}{T^3} \end{array}$$

{32, {{2, 9}, {2, 6, 7}}, swaph, {2, 7}}

$$\left(\begin{array}{l} 12 + \frac{1}{T^6} + \frac{1}{T^5} - \frac{7}{T^4} + \frac{10}{T^3} - \frac{3}{T^2} - \frac{8}{T} - 7T + 2T^2 \\ t[2] \\ t[9] \\ 1+\Sigma/\omega \end{array} \right) \begin{array}{l} h[2] \\ -2 + \frac{1}{T^9} - \frac{5}{T^7} + \frac{10}{T^6} - \frac{10}{T^5} + \frac{7}{T^4} - \frac{7}{T^3} + \frac{6}{T^2} - \frac{1}{T} + T + T^2 - T^3 \quad 18 - \\ -10 + \frac{1}{T^8} - \frac{2}{T^7} - \frac{1}{T^6} + \frac{6}{T^5} - \frac{8}{T^4} + \frac{9}{T^3} - \frac{10}{T^2} + \frac{11}{T} + 6T - 3T^2 + T^3 \quad -38 \\ \frac{1}{T^3} \end{array}$$

{33, {{2, 9}, {2, 6, 7}}, swaph, {9, 7}}

$$\left(\begin{array}{l} 4 + \frac{1}{T^6} - \frac{5}{T^4} + \frac{11}{T^3} - \frac{10}{T^2} + \frac{2}{T} - 4T + 2T^2 \\ t[2] \\ t[9] \\ 1 + \Sigma/\omega \end{array} \right) \begin{array}{l} h[2] \\ 6 + \frac{1}{T^9} - \frac{5}{T^7} + \frac{9}{T^6} - \frac{8}{T^5} + \frac{8}{T^4} - \frac{13}{T^3} + \frac{14}{T^2} - \frac{9}{T} - 7T + 8T^2 - 6T^3 + 3T^4 - T^5 \\ -10 + \frac{1}{T^6} - \frac{2}{T^5} - \frac{1}{T^4} + \frac{6}{T^3} - \frac{8}{T^2} + \frac{9}{T} + 11T - 10T^2 + 6T^3 - 3T^4 + T^5 \\ \frac{1}{T^3} \end{array} \cdot$$

{34, {{2, 9}, {2, 6, 7}}, swaph, {9, 7}}

$$\left(\begin{array}{l} -3 + \frac{1}{T^6} - \frac{5}{T^4} + \frac{10}{T^3} - \frac{8}{T^2} + \frac{3}{T} + 6T - 6T^2 + 3T^3 \\ t[2] \\ t[9] \\ 1 + \Sigma/\omega \end{array} \right) \begin{array}{l} h[2] \\ 14 + \frac{1}{T^9} - \frac{5}{T^7} + \frac{9}{T^6} - \frac{8}{T^5} + \frac{7}{T^4} - \frac{11}{T^3} + \frac{15}{T^2} - \frac{15}{T} - 15T + 16T^2 - 14T^3 \\ -8 + \frac{1}{T^4} - \frac{2}{T^3} - \frac{1}{T^2} + \frac{6}{T} + 9T - 10T^2 + 11T^3 - 10T^4 + 6 \\ \frac{1}{T^3} \end{array} \cdot$$

{35, {{2, 9}, {2, 6, 7}}, tm, {2, 9, 2}}

$$\left(\begin{array}{l} -3 + \frac{1}{T^6} - \frac{5}{T^4} + \frac{10}{T^3} - \frac{8}{T^2} + \frac{3}{T} + 6T - 6T^2 + 3T^3 \\ t[2] \\ 1 + \Sigma/\omega \end{array} \right) \begin{array}{l} h[2] \\ 6 + \frac{1}{T^9} - \frac{5}{T^7} + \frac{9}{T^6} - \frac{8}{T^5} + \frac{8}{T^4} - \frac{13}{T^3} + \frac{14}{T^2} - \frac{9}{T} - 6T + 6T^2 - 3T^3 \\ 6 - \frac{1}{T^6} \\ \frac{1}{T^3} \end{array} \cdot$$

{36, {{2}, {2, 6, 7}}, hm, {6, 7, 6}}

$$\left(\begin{array}{l} -3 + \frac{1}{T^6} - \frac{5}{T^4} + \frac{10}{T^3} - \frac{8}{T^2} + \frac{3}{T} + 6T - 6T^2 + 3T^3 \\ t[2] \\ 1 + \Sigma/\omega \end{array} \right) \begin{array}{l} h[2] \\ 6 + \frac{1}{T^9} - \frac{5}{T^7} + \frac{9}{T^6} - \frac{8}{T^5} + \frac{8}{T^4} - \frac{13}{T^3} + \frac{14}{T^2} - \frac{9}{T} - 6T + 6T^2 - 3T^3 \\ 13 - ; \\ \frac{1}{T^3} \end{array} \cdot$$

{37, {{2}, {2, 6}}, swaph, {2, 2}}

$$\left(\begin{array}{l} 3 + \frac{1}{T^9} - \frac{5}{T^7} + \frac{10}{T^6} - \frac{8}{T^5} + \frac{3}{T^4} - \frac{3}{T^3} + \frac{6}{T^2} - \frac{6}{T} \\ t[2] \\ 1 + \Sigma/\omega \end{array} \right) \begin{array}{l} h[2] \\ -3 + \frac{1}{T^{12}} - \frac{5}{T^{10}} + \frac{9}{T^9} - \frac{8}{T^8} + \frac{8}{T^7} - \frac{13}{T^6} + \frac{14}{T^5} - \frac{9}{T^4} + \frac{6}{T^3} - \frac{6}{T^2} + \frac{6}{T} - 6 - \frac{1}{T^9} + \frac{5}{T^7} \\ \frac{1}{T^3} \end{array} \cdot$$

{38, {{2}, {2, 6}}, swaph, {2, 2}}

$$\left(\begin{array}{l} \frac{1}{T^{12}} - \frac{5}{T^{10}} + \frac{10}{T^9} - \frac{8}{T^8} + \frac{3}{T^7} - \frac{3}{T^6} + \frac{6}{T^5} - \frac{6}{T^4} + \frac{3}{T^3} \\ t[2] \\ 1 + \Sigma/\omega \end{array} \right) \begin{array}{l} h[2] \\ \frac{1}{T^{15}} - \frac{5}{T^{13}} + \frac{9}{T^{12}} - \frac{8}{T^{11}} + \frac{8}{T^{10}} - \frac{13}{T^9} + \frac{14}{T^8} - \frac{9}{T^7} + \frac{6}{T^6} - \frac{6}{T^5} + \frac{6}{T^4} - \frac{3}{T^3} \\ 3 - \frac{1}{T^{12}} \\ \frac{1}{T^3} \end{array} \cdot$$

{39, {{2}, {2, 6}}, swaph, {2, 2}}

$$\left(\begin{array}{l} \frac{1}{T^{15}} - \frac{5}{T^{13}} + \frac{10}{T^{12}} - \frac{8}{T^{11}} + \frac{3}{T^{10}} - \frac{3}{T^9} + \frac{6}{T^8} - \frac{6}{T^7} + \frac{3}{T^6} \\ t[2] \\ 1 + \Sigma/\omega \end{array} \right) \begin{array}{l} h[2] \\ \frac{1}{T^{18}} - \frac{5}{T^{16}} + \frac{9}{T^{15}} - \frac{8}{T^{14}} + \frac{8}{T^{13}} - \frac{13}{T^{12}} + \frac{14}{T^{11}} - \frac{9}{T^{10}} + \frac{6}{T^9} - \frac{6}{T^8} + \frac{6}{T^7} - \frac{3}{T^6} - \frac{1}{T^5} \\ \frac{1}{T^3} \end{array} \cdot$$

{40, {{2}, {2, 6}}, swaph, {2, 6}}

$$\left(\begin{array}{l} \frac{1}{T^{12}} - \frac{5}{T^{10}} + \frac{10}{T^9} - \frac{8}{T^8} + \frac{3}{T^7} - \frac{3}{T^6} + \frac{6}{T^5} - \frac{6}{T^4} + \frac{3}{T^3} \\ t[2] \\ 1 + \Sigma/\omega \end{array} \right) \begin{array}{l} h[2] \\ \frac{1}{T^{15}} - \frac{5}{T^{13}} + \frac{9}{T^{12}} - \frac{8}{T^{11}} + \frac{8}{T^{10}} - \frac{13}{T^9} + \frac{14}{T^8} - \frac{9}{T^7} + \frac{6}{T^6} - \frac{6}{T^5} + \frac{6}{T^4} - \frac{3}{T^3} \\ 3 - \frac{1}{T^{12}} \\ \frac{1}{T^3} \end{array} \cdot$$

{41, {{2}, {2, 6}}, swaph, {2, 2}}

$$\left(\begin{array}{l} \frac{1}{T^{15}} - \frac{5}{T^{13}} + \frac{10}{T^{12}} - \frac{8}{T^{11}} + \frac{3}{T^{10}} - \frac{3}{T^9} + \frac{6}{T^8} - \frac{6}{T^7} + \frac{3}{T^6} \\ t[2] \\ 1+\Sigma/\omega \end{array} \quad \begin{array}{l} h[2] \\ \frac{1}{T^{18}} - \frac{5}{T^{16}} + \frac{9}{T^{15}} - \frac{8}{T^{14}} + \frac{8}{T^{13}} - \frac{13}{T^{12}} + \frac{14}{T^{11}} - \frac{9}{T^{10}} + \frac{6}{T^9} - \frac{6}{T^8} + \frac{6}{T^7} - \frac{3}{T^6} - \frac{1}{T^5} \\ \frac{1}{T^3} \end{array} \right)$$

{42, {{2}, {2, 6}}, swaph, {2, 6}}

$$\left(\begin{array}{l} \frac{1}{T^{12}} - \frac{5}{T^{10}} + \frac{10}{T^9} - \frac{8}{T^8} + \frac{3}{T^7} - \frac{3}{T^6} + \frac{6}{T^5} - \frac{6}{T^4} + \frac{3}{T^3} \\ t[2] \\ 1+\Sigma/\omega \end{array} \quad \begin{array}{l} h[2] \\ \frac{1}{T^{15}} - \frac{5}{T^{13}} + \frac{9}{T^{12}} - \frac{8}{T^{11}} + \frac{8}{T^{10}} - \frac{13}{T^9} + \frac{14}{T^8} - \frac{9}{T^7} + \frac{6}{T^6} - \frac{6}{T^5} + \frac{6}{T^4} - \frac{3}{T^3} \\ 3 - \frac{1}{T^{12}} \\ \frac{1}{T^3} \end{array} \right)$$

{43, {{2}, {2, 6}}, swaph, {2, 2}}

$$\left(\begin{array}{l} \frac{1}{T^{15}} - \frac{5}{T^{13}} + \frac{10}{T^{12}} - \frac{8}{T^{11}} + \frac{3}{T^{10}} - \frac{3}{T^9} + \frac{6}{T^8} - \frac{6}{T^7} + \frac{3}{T^6} \\ t[2] \\ 1+\Sigma/\omega \end{array} \quad \begin{array}{l} h[2] \\ \frac{1}{T^{18}} - \frac{5}{T^{16}} + \frac{9}{T^{15}} - \frac{8}{T^{14}} + \frac{8}{T^{13}} - \frac{13}{T^{12}} + \frac{14}{T^{11}} - \frac{9}{T^{10}} + \frac{6}{T^9} - \frac{6}{T^8} + \frac{6}{T^7} - \frac{3}{T^6} - \frac{1}{T^5} \\ \frac{1}{T^3} \end{array} \right)$$

{44, {{2}, {2, 6}}, hm, {6, 2, 6}}

$$\left(\begin{array}{l} \frac{1}{T^{15}} - \frac{5}{T^{13}} + \frac{10}{T^{12}} - \frac{8}{T^{11}} + \frac{3}{T^{10}} - \frac{3}{T^9} + \frac{6}{T^8} - \frac{6}{T^7} + \frac{3}{T^6} \\ 1+\Sigma/\omega \end{array} \quad \begin{array}{l} h[6] \\ 1 \end{array} \right)$$

$$\left\{ \text{True}, \left(\begin{array}{l} \frac{1}{T^{15}} - \frac{5}{T^{13}} + \frac{10}{T^{12}} - \frac{8}{T^{11}} + \frac{3}{T^{10}} - \frac{3}{T^9} + \frac{6}{T^8} - \frac{6}{T^7} + \frac{3}{T^6} \\ 1+\Sigma/\omega \end{array} \quad \begin{array}{l} h[6] \\ 1 \end{array} \right) \right\}$$

$\{\omega, \sigma, \mu\} = \text{List @@ } \beta[25]$

$$\begin{aligned}
& \left\{ 2 + \frac{1}{T^8} + \frac{1}{T^7} - \frac{7}{T^6} + \frac{10}{T^5} - \frac{3}{T^4} - \frac{8}{T^3} + \frac{12}{T^2} - \frac{7}{T}, \frac{h[2]}{T^3} + T h[3] + T h[5] + \frac{h[6]}{T} + T^2 h[7], \right. \\
& h[2] \left(\left(3 + \frac{1}{T^9} - \frac{1}{T^8} - \frac{4}{T^7} + \frac{10}{T^6} - \frac{10}{T^5} + \frac{4}{T^4} + \frac{3}{T^3} - \frac{3}{T^2} - \frac{2}{T} - T \right) t[2] + \right. \\
& \quad \left(-4 - \frac{1}{T^9} + \frac{1}{T^8} + \frac{3}{T^7} - \frac{6}{T^6} + \frac{4}{T^5} - \frac{3}{T^3} + \frac{1}{T^2} + \frac{4}{T} + T \right) t[6] + \left(\frac{1}{T^{11}} - \frac{3}{T^9} + \frac{3}{T^8} - \frac{1}{T^7} \right) t[8] + \\
& \quad \left. \left(\frac{1}{T^5} - \frac{2}{T^4} + \frac{3}{T^3} - \frac{3}{T^2} + \frac{1}{T} \right) t[9] + \left(-1 + \frac{1}{T^{10}} - \frac{4}{T^9} + \frac{6}{T^8} - \frac{2}{T^7} - \frac{5}{T^6} + \frac{7}{T^5} - \frac{6}{T^4} + \frac{7}{T^3} - \frac{7}{T^2} + \frac{4}{T} \right) t[10] \right) + \\
& h[7] \left(\left(3 + \frac{1}{T^{10}} - \frac{2}{T^9} + \frac{1}{T^8} - \frac{3}{T^7} + \frac{11}{T^6} - \frac{17}{T^5} + \frac{15}{T^4} - \frac{7}{T^3} + \frac{1}{T^2} - \frac{2}{T} - T \right) t[2] + \right. \\
& \quad \left(8 - \frac{1}{T^{10}} + \frac{3}{T^9} - \frac{4}{T^8} + \frac{5}{T^7} - \frac{6}{T^6} + \frac{6}{T^5} - \frac{8}{T^4} + \frac{8}{T^3} - \frac{1}{T^2} - \frac{6}{T} - 6T + 2T^2 \right) t[6] + \\
& \quad \left(\frac{1}{T^{12}} - \frac{2}{T^{11}} + \frac{2}{T^{10}} - \frac{3}{T^9} + \frac{3}{T^8} - \frac{1}{T^7} \right) t[8] + \left(-\frac{1}{T^7} + \frac{2}{T^6} + \frac{1}{T^5} - \frac{7}{T^4} + \frac{10}{T^3} - \frac{8}{T^2} + \frac{3}{T} \right) t[9] + \\
& \quad \left. \left(-1 - \frac{1}{T^{12}} + \frac{2}{T^{11}} - \frac{2}{T^{10}} + \frac{2}{T^9} - \frac{2}{T^8} - \frac{1}{T^7} + \frac{1}{T^6} + \frac{1}{T^5} - \frac{4}{T^4} + \frac{7}{T^3} - \frac{7}{T^2} + \frac{4}{T} \right) t[10] \right) + \\
& h[6] \left(\left(4 - \frac{1}{T^{11}} + \frac{3}{T^{10}} - \frac{3}{T^9} + \frac{4}{T^8} - \frac{14}{T^7} + \frac{28}{T^6} - \frac{32}{T^5} + \frac{22}{T^4} - \frac{8}{T^3} + \frac{3}{T^2} - \frac{5}{T} - T \right) t[2] + \right. \\
& \quad \left(-5 + \frac{1}{T^{11}} - \frac{4}{T^{10}} + \frac{7}{T^9} - \frac{9}{T^8} + \frac{12}{T^7} - \frac{12}{T^6} + \frac{6}{T^5} + \frac{1}{T^4} - \frac{4}{T^3} + \frac{6}{T} + T \right) t[6] + \\
& \quad \left(-\frac{1}{T^{13}} + \frac{3}{T^{12}} - \frac{4}{T^{11}} + \frac{5}{T^{10}} - \frac{6}{T^9} + \frac{4}{T^8} - \frac{1}{T^7} \right) t[8] + \left(\frac{1}{T^8} - \frac{3}{T^7} + \frac{1}{T^6} + \frac{8}{T^5} - \frac{17}{T^4} + \frac{18}{T^3} - \frac{11}{T^2} + \frac{3}{T} \right) t[9] + \\
& \quad \left. \left(-1 + \frac{1}{T^{13}} - \frac{3}{T^{12}} + \frac{4}{T^{11}} - \frac{4}{T^{10}} + \frac{3}{T^9} - \frac{2}{T^7} + \frac{5}{T^5} - \frac{11}{T^4} + \frac{14}{T^3} - \frac{11}{T^2} + \frac{5}{T} \right) t[10] \right) + \\
& h[5] \left(\left(-15 + \frac{1}{T^{10}} - \frac{3}{T^9} + \frac{3}{T^8} - \frac{4}{T^7} + \frac{13}{T^6} - \frac{28}{T^5} + \frac{40}{T^4} - \frac{39}{T^3} + \frac{21}{T^2} + \frac{2}{T} + 15T - 8T^2 + 2T^3 \right) t[2] + \right. \\
& \quad \left(14 - \frac{1}{T^{10}} + \frac{4}{T^9} - \frac{7}{T^8} + \frac{9}{T^7} - \frac{11}{T^6} + \frac{12}{T^5} - \frac{14}{T^4} + \frac{16}{T^3} - \frac{9}{T^2} - \frac{5}{T} - 14T + 8T^2 - 2T^3 \right) t[6] + \\
& \quad \left(\frac{1}{T^{12}} - \frac{3}{T^{11}} + \frac{4}{T^{10}} - \frac{5}{T^9} + \frac{6}{T^8} - \frac{4}{T^7} + \frac{1}{T^6} \right) t[8] + \left(-3 - \frac{1}{T^7} + \frac{3}{T^6} - \frac{1}{T^5} - \frac{8}{T^4} + \frac{17}{T^3} - \frac{18}{T^2} + \frac{11}{T} \right) t[9] + \\
& \quad \left. \left(-5 - \frac{1}{T^{12}} + \frac{3}{T^{11}} - \frac{4}{T^{10}} + \frac{4}{T^9} - \frac{3}{T^8} + \frac{2}{T^6} - \frac{5}{T^4} + \frac{11}{T^3} - \frac{14}{T^2} + \frac{11}{T} + T \right) t[10] \right) + \\
& h[3] \left(\left(5 + \frac{1}{T^9} - \frac{2}{T^8} - \frac{3}{T^7} + \frac{14}{T^6} - \frac{20}{T^5} + \frac{14}{T^4} - \frac{1}{T^3} - \frac{6}{T^2} + \frac{1}{T} - 4T + T^2 \right) t[2] + \right. \\
& \quad \left(-8 - \frac{1}{T^9} + \frac{2}{T^8} + \frac{2}{T^7} - \frac{9}{T^6} + \frac{10}{T^5} - \frac{4}{T^4} - \frac{3}{T^3} + \frac{4}{T^2} + \frac{3}{T} + 5T - T^2 \right) t[6] + \\
& \quad \left(\frac{1}{T^{11}} - \frac{1}{T^{10}} - \frac{3}{T^9} + \frac{6}{T^8} - \frac{4}{T^7} + \frac{1}{T^6} \right) t[8] + \left(-1 + \frac{1}{T^5} - \frac{3}{T^4} + \frac{5}{T^3} - \frac{6}{T^2} + \frac{4}{T} \right) t[9] + \\
& \quad \left. \left(-5 - \frac{1}{T^{11}} + \frac{1}{T^{10}} + \frac{3}{T^9} - \frac{7}{T^8} + \frac{5}{T^7} + \frac{2}{T^6} - \frac{8}{T^5} + \frac{6}{T^4} + \frac{4}{T^3} - \frac{12}{T^2} + \frac{11}{T} + T \right) t[10] \right) \}
\end{aligned}$$

```

{tails, heads} = {tL[μ], hL[μ]};
(mat = Outer[{∂t[#1], h[#2] μ} &, tL[μ], hL[μ]]) // MatrixForm

```

$$\begin{pmatrix}
3 + \frac{1}{T^9} - \frac{1}{T^8} - \frac{4}{T^7} + \frac{10}{T^6} - \frac{10}{T^5} + \frac{4}{T^4} + \frac{3}{T^3} - \frac{3}{T^2} - \frac{2}{T} - T & 5 + \frac{1}{T^9} - \frac{2}{T^8} - \frac{3}{T^7} + \frac{14}{T^6} - \frac{20}{T^5} + \frac{14}{T^4} - \frac{1}{T^3} - \frac{6}{T^2} + \frac{1}{T} - 4T + T^2 \\
-4 - \frac{1}{T^9} + \frac{1}{T^8} + \frac{3}{T^7} - \frac{6}{T^6} + \frac{4}{T^5} - \frac{3}{T^4} + \frac{1}{T^3} + \frac{4}{T^2} + T & -8 - \frac{1}{T^9} + \frac{2}{T^8} + \frac{2}{T^7} - \frac{9}{T^6} + \frac{10}{T^5} - \frac{4}{T^4} - \frac{3}{T^3} + \frac{4}{T^2} + \frac{3}{T} + 5T - T^2 \\
\frac{1}{T^{11}} - \frac{3}{T^9} + \frac{3}{T^8} - \frac{1}{T^7} & \frac{1}{T^{11}} - \frac{1}{T^{10}} - \frac{3}{T^9} + \frac{6}{T^8} - \frac{4}{T^7} + \frac{1}{T^6} \\
\frac{1}{T^5} - \frac{2}{T^4} + \frac{3}{T^3} - \frac{3}{T^2} + \frac{1}{T} & -1 + \frac{1}{T^5} - \frac{3}{T^4} + \frac{5}{T^3} - \frac{6}{T^2} + \frac{4}{T} \\
-1 + \frac{1}{T^{10}} - \frac{4}{T^9} + \frac{6}{T^8} - \frac{2}{T^7} - \frac{5}{T^6} + \frac{7}{T^5} - \frac{6}{T^4} + \frac{7}{T^3} - \frac{7}{T^2} + \frac{4}{T} & -5 - \frac{1}{T^{11}} + \frac{1}{T^{10}} + \frac{3}{T^9} - \frac{7}{T^8} + \frac{5}{T^7} + \frac{2}{T^6} - \frac{8}{T^5} + \frac{6}{T^4} + \frac{4}{T^3} - \frac{12}{T^2} + \frac{11}{T} +
\end{pmatrix}$$

```

Expand[Simplify[Flatten[Minors[mat, 3]] / ω2]]

```

$$\begin{aligned}
& \left\{ 0, 0, 0, \frac{1}{T^{11}} - \frac{5}{T^{10}} + \frac{10}{T^9} - \frac{11}{T^8} + \frac{8}{T^7} - \frac{4}{T^6} + \frac{1}{T^5}, -\frac{1}{T^6} + \frac{4}{T^5} - \frac{6}{T^4} + \frac{4}{T^3} - \frac{1}{T^2}, -\frac{1}{T^{11}} + \frac{4}{T^{10}} - \frac{6}{T^9} + \frac{4}{T^8} - \frac{1}{T^7}, \right. \\
& \frac{1}{T^{11}} - \frac{6}{T^{10}} + \frac{15}{T^9} - \frac{21}{T^8} + \frac{19}{T^7} - \frac{12}{T^6} + \frac{5}{T^5} - \frac{1}{T^4}, -\frac{1}{T^6} + \frac{5}{T^5} - \frac{10}{T^4} + \frac{10}{T^3} - \frac{5}{T^2} + \frac{1}{T}, \\
& -\frac{1}{T^{11}} + \frac{5}{T^{10}} - \frac{10}{T^9} + \frac{10}{T^8} - \frac{5}{T^7} + \frac{1}{T^6}, -\frac{1}{T^9} + \frac{4}{T^8} - \frac{7}{T^7} + \frac{9}{T^6} - \frac{11}{T^5} + \frac{10}{T^4} - \frac{5}{T^3} + \frac{1}{T^2}, 0, 0, 0, \\
& 8 + \frac{1}{T^4} - \frac{5}{T^3} + \frac{10}{T^2} - \frac{11}{T} - 4T + T^2, 5 + \frac{1}{T^6} - \frac{4}{T^5} + \frac{6}{T^4} - \frac{4}{T^3} + \frac{1}{T^2} - \frac{1}{T} - 10T + 10T^2 - 5T^3 + T^4, \\
& 2 - \frac{1}{T^7} + \frac{4}{T^6} - \frac{6}{T^5} + \frac{3}{T^4} + \frac{3}{T^3} - \frac{6}{T^2} + \frac{3}{T} - 3T + T^2, 19 + \frac{1}{T^4} - \frac{6}{T^3} + \frac{15}{T^2} - \frac{21}{T} - 12T + 5T^2 - T^3, \\
& 6 + \frac{1}{T^6} - \frac{5}{T^5} + \frac{10}{T^4} - \frac{10}{T^3} + \frac{5}{T^2} - \frac{2}{T} - 15T + 20T^2 - 15T^3 + 6T^4 - T^5, \\
& -1 - \frac{1}{T^7} + \frac{5}{T^6} - \frac{10}{T^5} + \frac{9}{T^4} - \frac{9}{T^3} + \frac{9}{T^2} - 5T + 4T^2 - T^3, -25 + \frac{1}{T^4} - \frac{4}{T^3} + \frac{4}{T^2} + \frac{7}{T} + 35T - 29T^2 + 14T^3 - 3T^4, \\
& 4 + \frac{1}{T^{13}} - \frac{6}{T^{12}} + \frac{15}{T^{11}} - \frac{21}{T^{10}} + \frac{19}{T^9} - \frac{13}{T^8} + \frac{12}{T^7} - \frac{21}{T^6} + \frac{30}{T^5} - \frac{25}{T^4} + \frac{10}{T^3} + \frac{2}{T^2} - \frac{6}{T} - T, \\
& -\frac{1}{T^{14}} + \frac{6}{T^{13}} - \frac{15}{T^{12}} + \frac{21}{T^{11}} - \frac{19}{T^{10}} + \frac{12}{T^9} - \frac{6}{T^8} + \frac{6}{T^7} - \frac{10}{T^6} + \frac{11}{T^5} - \frac{8}{T^4} + \frac{4}{T^3} - \frac{1}{T^2}, \\
& -4 + \frac{1}{T^{13}} - \frac{5}{T^{12}} + \frac{10}{T^{11}} - \frac{10}{T^{10}} + \frac{6}{T^9} - \frac{7}{T^8} + \frac{16}{T^7} - \frac{24}{T^6} + \frac{20}{T^5} - \frac{6}{T^4} - \frac{3}{T^3} + \frac{5}{T} + T, \\
& 12 - \frac{1}{T^9} + \frac{7}{T^8} - \frac{21}{T^7} + \frac{36}{T^6} - \frac{41}{T^5} + \frac{37}{T^4} - \frac{32}{T^3} + \frac{27}{T^2} - \frac{20}{T} - 5T + T^2, \\
& 12 + \frac{1}{T^{11}} - \frac{4}{T^{10}} + \frac{7}{T^9} - \frac{9}{T^8} + \frac{11}{T^7} - \frac{11}{T^6} + \frac{10}{T^5} - \frac{10}{T^4} + \frac{6}{T^3} + \frac{2}{T^2} - \frac{8}{T} - 15T + 15T^2 - 11T^3 + 5T^4 - T^5, \\
& -2 - \frac{1}{T^{12}} + \frac{4}{T^{11}} - \frac{7}{T^{10}} + \frac{10}{T^9} - \frac{17}{T^8} + \frac{25}{T^7} - \frac{26}{T^6} + \frac{20}{T^5} - \frac{15}{T^4} + \frac{16}{T^3} - \frac{16}{T^2} + \frac{9}{T}, \\
& 35 - \frac{1}{T^{11}} + \frac{6}{T^{10}} - \frac{15}{T^9} + \frac{20}{T^8} - \frac{13}{T^7} - \frac{3}{T^6} + \frac{14}{T^5} - \frac{6}{T^4} - \frac{19}{T^3} + \frac{42}{T^2} - \frac{47}{T} - 18T + 6T^2 - T^3, \\
& -8 + \frac{1}{T^6} - \frac{5}{T^5} + \frac{10}{T^4} - \frac{9}{T^3} + \frac{9}{T^2} - 5T + 20T^2 - 24T^3 + 16T^4 - 6T^5 + T^6, \\
& -6 + \frac{1}{T^{11}} - \frac{5}{T^{10}} + \frac{10}{T^9} - \frac{9}{T^8} + \frac{9}{T^7} - \frac{8}{T^6} - \frac{5}{T^5} + \frac{20}{T^4} - \frac{24}{T^3} + \frac{16}{T^2} + T, \\
& -16 + \frac{1}{T^9} - \frac{4}{T^8} + \frac{7}{T^7} - \frac{8}{T^6} + \frac{7}{T^5} - \frac{3}{T^4} - \frac{2}{T^3} + \frac{2}{T^2} + \frac{5}{T} + 25T - 25T^2 + 16T^3 - 6T^4 + T^5, 0,
\end{aligned}$$

$$\begin{aligned}
& 0, 0, \frac{1}{T^9} - \frac{4}{T^8} + \frac{6}{T^7} - \frac{4}{T^6} + \frac{1}{T^5}, -\frac{1}{T^8} + \frac{3}{T^7} - \frac{3}{T^6} + \frac{1}{T^5}, 0, \frac{1}{T^9} - \frac{5}{T^8} + \frac{10}{T^7} - \frac{10}{T^6} + \frac{5}{T^5} - \frac{1}{T^4}, \\
& -\frac{1}{T^8} + \frac{4}{T^7} - \frac{6}{T^6} + \frac{4}{T^5} - \frac{1}{T^4}, 0, 0, -\frac{1}{T^{15}} + \frac{5}{T^{14}} - \frac{10}{T^{13}} + \frac{11}{T^{12}} - \frac{7}{T^{11}} - \frac{1}{T^{10}} + \frac{9}{T^9} - \frac{10}{T^8} + \frac{5}{T^7} - \frac{1}{T^6}, \\
& \frac{1}{T^{16}} - \frac{5}{T^{15}} + \frac{10}{T^{14}} - \frac{10}{T^{13}} + \frac{5}{T^{12}} - \frac{1}{T^{11}}, -\frac{1}{T^{15}} + \frac{4}{T^{14}} - \frac{6}{T^{13}} + \frac{4}{T^{12}} - \frac{1}{T^{11}}, \\
& \frac{1}{T^{14}} - \frac{4}{T^{13}} + \frac{7}{T^{12}} - \frac{9}{T^{11}} + \frac{11}{T^{10}} - \frac{10}{T^9} + \frac{5}{T^8} - \frac{1}{T^7}, -\frac{1}{T^{13}} + \frac{3}{T^{12}} - \frac{4}{T^{11}} + \frac{5}{T^{10}} - \frac{6}{T^9} + \frac{4}{T^8} - \frac{1}{T^7}, \\
& 0, 0, 0, 0, 0, 1 - \frac{1}{T^{11}} + \frac{5}{T^{10}} - \frac{10}{T^9} + \frac{9}{T^8} - \frac{8}{T^6} + \frac{5}{T^5} + \frac{7}{T^4} - \frac{16}{T^3} + \frac{14}{T^2} - \frac{6}{T}, \\
& \frac{1}{T^{12}} - \frac{5}{T^{11}} + \frac{10}{T^{10}} - \frac{9}{T^9} + \frac{9}{T^7} - \frac{9}{T^6} + \frac{1}{T^5} + \frac{5}{T^4} - \frac{4}{T^3} + \frac{1}{T^2}, \\
& -\frac{1}{T^{11}} + \frac{4}{T^{10}} - \frac{6}{T^9} + \frac{3}{T^8} + \frac{3}{T^7} - \frac{6}{T^6} + \frac{3}{T^5} + \frac{2}{T^4} - \frac{3}{T^3} + \frac{1}{T^2}, \\
& -11 + \frac{2}{T^7} - \frac{10}{T^6} + \frac{22}{T^5} - \frac{29}{T^4} + \frac{27}{T^3} - \frac{21}{T^2} + \frac{16}{T} + 5T - T^2, -7 - \frac{2}{T^6} + \frac{8}{T^5} - \frac{14}{T^4} + \frac{15}{T^3} - \frac{12}{T^2} + \frac{9}{T} + 4T - T^2, \\
& 0, -24 + \frac{1}{T^9} - \frac{5}{T^8} + \frac{10}{T^7} - \frac{9}{T^6} + \frac{9}{T^4} - \frac{8}{T^3} - \frac{5}{T^2} + \frac{20}{T} + 16T - 6T^2 + T^3, \\
& -13 - \frac{1}{T^8} + \frac{4}{T^7} - \frac{6}{T^6} + \frac{3}{T^5} + \frac{3}{T^4} - \frac{6}{T^3} + \frac{2}{T^2} + \frac{7}{T} + 11T - 5T^2 + T^3, 0, \\
& 0, 0, 0, 0, -\frac{1}{T^9} + \frac{4}{T^8} - \frac{6}{T^7} + \frac{4}{T^6} - \frac{1}{T^5}, 0, \frac{1}{T^9} - \frac{3}{T^8} + \frac{3}{T^7} - \frac{1}{T^6}, \\
& -\frac{1}{T^9} + \frac{5}{T^8} - \frac{10}{T^7} + \frac{10}{T^6} - \frac{5}{T^5} + \frac{1}{T^4}, 0, \frac{1}{T^9} - \frac{4}{T^8} + \frac{6}{T^7} - \frac{4}{T^6} + \frac{1}{T^5}, 0, \\
& -\frac{1}{T^{11}} + \frac{5}{T^{10}} - \frac{10}{T^9} + \frac{10}{T^8} - \frac{5}{T^7} + \frac{1}{T^6}, -\frac{1}{T^{13}} + \frac{3}{T^{12}} - \frac{3}{T^{11}} + \frac{1}{T^{10}}, -\frac{1}{T^{11}} + \frac{4}{T^{10}} - \frac{6}{T^9} + \frac{4}{T^8} - \frac{1}{T^7}, \\
& -\frac{1}{T^{14}} + \frac{4}{T^{13}} - \frac{7}{T^{12}} + \frac{9}{T^{11}} - \frac{11}{T^{10}} + \frac{10}{T^9} - \frac{5}{T^8} + \frac{1}{T^7}, 0, \frac{1}{T^{14}} - \frac{3}{T^{13}} + \frac{4}{T^{12}} - \frac{5}{T^{11}} + \frac{10}{T^{10}} - \frac{4}{T^9} + \frac{1}{T^8}, \\
& 0, 0, 0, 0, 0, -1 + \frac{1}{T^{11}} - \frac{5}{T^{10}} + \frac{10}{T^9} - \frac{10}{T^8} + \frac{5}{T^7} - \frac{2}{T^6} + \frac{6}{T^5} - \frac{15}{T^4} + \frac{20}{T^3} - \frac{15}{T^2} + \frac{6}{T}, \\
& -\frac{1}{T^{12}} + \frac{5}{T^{11}} - \frac{10}{T^{10}} + \frac{10}{T^9} - \frac{5}{T^8} + \frac{1}{T^7} - \frac{2}{T^6} + \frac{7}{T^5} - \frac{9}{T^4} + \frac{5}{T^3} - \frac{1}{T^2}, \\
& \frac{1}{T^{11}} - \frac{4}{T^{10}} + \frac{6}{T^9} - \frac{4}{T^8} + \frac{1}{T^7} - \frac{1}{T^6} + \frac{5}{T^5} - \frac{10}{T^4} + \frac{10}{T^3} - \frac{5}{T^2} + \frac{1}{T}, \\
& 11 - \frac{2}{T^7} + \frac{10}{T^6} - \frac{22}{T^5} + \frac{29}{T^4} - \frac{27}{T^3} + \frac{21}{T^2} - \frac{16}{T} - 5T + T^2, 0, -4 + \frac{2}{T^7} - \frac{8}{T^6} + \frac{14}{T^5} - \frac{15}{T^4} + \frac{12}{T^3} - \frac{9}{T^2} + \frac{7}{T} + T, \\
& 24 - \frac{1}{T^9} + \frac{5}{T^8} - \frac{10}{T^7} + \frac{9}{T^6} - \frac{9}{T^4} + \frac{8}{T^3} + \frac{5}{T^2} - \frac{20}{T} - 16T + 6T^2 - T^3, 0, \\
& -11 + \frac{1}{T^9} - \frac{4}{T^8} + \frac{6}{T^7} - \frac{3}{T^6} - \frac{3}{T^5} + \frac{6}{T^4} - \frac{2}{T^3} - \frac{7}{T^2} + \frac{13}{T} + 5T - T^2, 0, -\frac{1}{T^{13}} + \frac{4}{T^{12}} - \frac{6}{T^{11}} + \frac{4}{T^{10}} - \frac{1}{T^9}, \\
& \left. \frac{1}{T^{14}} - \frac{4}{T^{13}} + \frac{6}{T^{12}} - \frac{4}{T^{11}} + \frac{1}{T^{10}}, -\frac{1}{T^{13}} + \frac{3}{T^{12}} - \frac{3}{T^{11}} + \frac{1}{T^{10}}, 0, 0, 0, 0, 0, 0, 0 \right\}
\end{aligned}$$

Expand[Simplify[Flatten[Minors[mat, 4]] / ω^3]]

$$\left\{ 0, 0, 0, \frac{1}{T^7} - \frac{4}{T^6} + \frac{6}{T^5} - \frac{4}{T^4} + \frac{1}{T^3}, \frac{1}{T^7} - \frac{5}{T^6} + \frac{10}{T^5} - \frac{10}{T^4} + \frac{5}{T^3} - \frac{1}{T^2}, \right.$$

$$-\frac{1}{T^{14}} + \frac{6}{T^{13}} - \frac{15}{T^{12}} + \frac{21}{T^{11}} - \frac{19}{T^{10}} + \frac{12}{T^9} - \frac{5}{T^8} + \frac{1}{T^7}, \frac{1}{T^9} - \frac{5}{T^8} + \frac{10}{T^7} - \frac{10}{T^6} + \frac{5}{T^5} - \frac{1}{T^4},$$

$$\frac{1}{T^{14}} - \frac{5}{T^{13}} + \frac{10}{T^{12}} - \frac{10}{T^{11}} + \frac{5}{T^{10}} - \frac{1}{T^9}, \frac{1}{T^{12}} - \frac{4}{T^{11}} + \frac{7}{T^{10}} - \frac{9}{T^9} + \frac{11}{T^8} - \frac{10}{T^7} + \frac{5}{T^6} - \frac{1}{T^5}, 0,$$

$$1 - \frac{1}{T^7} + \frac{6}{T^6} - \frac{15}{T^5} + \frac{21}{T^4} - \frac{19}{T^3} + \frac{12}{T^2} - \frac{5}{T}, 15 - \frac{1}{T^9} + \frac{5}{T^8} - \frac{10}{T^7} + \frac{10}{T^6} - \frac{5}{T^5} + \frac{2}{T^4} - \frac{6}{T^3} + \frac{15}{T^2} - \frac{20}{T} - 6T + T^2,$$

$$1 + \frac{1}{T^{10}} - \frac{5}{T^9} + \frac{10}{T^8} - \frac{9}{T^7} + \frac{9}{T^5} - \frac{9}{T^4} + \frac{1}{T^3} + \frac{5}{T^2} - \frac{4}{T},$$

$$-21 + \frac{2}{T^5} - \frac{10}{T^4} + \frac{22}{T^3} - \frac{29}{T^2} + \frac{27}{T} + 16T - 11T^2 + 5T^3 - T^4,$$

$$-5 + \frac{1}{T^7} - \frac{5}{T^6} + \frac{10}{T^5} - \frac{9}{T^4} + \frac{9}{T^2} - \frac{8}{T} + 20T - 24T^2 + 16T^3 - 6T^4 + T^5,$$

$$-\frac{1}{T^{12}} + \frac{5}{T^{11}} - \frac{10}{T^{10}} + \frac{10}{T^9} - \frac{5}{T^8} + \frac{1}{T^7}, \frac{1}{T^{11}} - \frac{4}{T^{10}} + \frac{6}{T^9} - \frac{4}{T^8} + \frac{1}{T^7}, 0, 0, 0,$$

$$\left. \frac{1}{T^{12}} - \frac{5}{T^{11}} + \frac{10}{T^{10}} - \frac{10}{T^9} + \frac{5}{T^8} - \frac{1}{T^7}, 0, -\frac{1}{T^{12}} + \frac{4}{T^{11}} - \frac{6}{T^{10}} + \frac{4}{T^9} - \frac{1}{T^8}, 0, 0 \right\}$$

Expand[Simplify[Flatten[Minors[mat, 5]]/ω⁴]

$$\left\{ \frac{1}{T^{10}} - \frac{5}{T^9} + \frac{10}{T^8} - \frac{10}{T^7} + \frac{5}{T^6} - \frac{1}{T^5} \right\}$$