

Pensieve header: The two-point function and the modified two-point function both have simple inverses. (Added Jan 23: A complete blunder - G1 is the same as G here).

```
In[*]:= SetDirectory["C:\\drorbn\\AcademicPensieve\\Projects\\APerturbedAlexanderInvariant"];
Once[<< KnotTheory` ; << RVK.m];
```

```
In[*]:= K = Knot[8, 8];
RVK[K]
```

```
Out[*]= RVK[{{{-1, 4, 1}, {-1, 8, 3}, {1, 14, 11}, {1, 12, 5}, {1, 6, 13}, {1, 16, 9},
{1, 10, 15}, {-1, 2, 7}}, {0, 0, 0, -1, 0, 0, 0, 0, 0, 0, 1, 0, 0, -1, 1}]
```

```
In[*]:= {Cs, r} = List@@RVK[K]
```

```
Out[*]= {{{{-1, 4, 1}, {-1, 8, 3}, {1, 14, 11}, {1, 12, 5}, {1, 6, 13}, {1, 16, 9},
{1, 10, 15}, {-1, 2, 7}}, {0, 0, 0, -1, 0, 0, 0, 0, 0, 0, 1, 0, 0, -1, 1}]
```

```
In[*]:= n = Length[Cs]; B = Table[0, 2 n, 2 n + 1];
```

```
Do[{s, i, j} = c;
```

$$B[[{i, j}, {i, j, i + 1, j + 1}]] = \begin{pmatrix} 1 & 0 & -1 & 0 \\ 0 & 1 & T^s & -1 - T^s \end{pmatrix}, \{c, Cs\};$$

```
In[*]:= B // MatrixForm
```

```
Out[*]//MatrixForm=
```

$$\begin{pmatrix} 1 & -\frac{1}{T} & 0 & 0 & -1 + \frac{1}{T} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 1 & -1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & -\frac{1}{T} & 0 & 0 & 0 & 0 & -1 + \frac{1}{T} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 & -1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 & -T & 0 & 0 & 0 & 0 & 0 & 0 & -1 + T & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 1 & -1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -1 + \frac{1}{T} & 0 & 0 & 0 & 1 & -\frac{1}{T} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & -1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & -T & 0 & 0 & 0 & 0 & 0 & 0 & -1 + T \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & -1 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & -T & 0 & 0 & -1 + T & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & -1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -1 + T & 0 & 0 & 0 & 0 & 0 & 1 & -T & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & -1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 + T & 0 & 0 & 0 & 1 & -T & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & -1 \end{pmatrix}$$

```
In[*]:= A = B[All, 2 ;;];
A // MatrixForm
```

Out[*]//MatrixForm=

$$\begin{pmatrix} -\frac{1}{T} & 0 & 0 & -1 + \frac{1}{T} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 1 & -1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 1 & -\frac{1}{T} & 0 & 0 & 0 & 0 & -1 + \frac{1}{T} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & -1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 & -T & 0 & 0 & 0 & 0 & 0 & -1 + T & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 & -1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -1 + \frac{1}{T} & 0 & 0 & 0 & 1 & -\frac{1}{T} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 1 & -1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & -T & 0 & 0 & 0 & 0 & 0 & -1 + T \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & -1 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & -T & 0 & 0 & -1 + T & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & -1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -1 + T & 0 & 0 & 0 & 0 & 0 & 1 & -T & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & -1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 + T & 0 & 0 & 0 & 1 & -T \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 \end{pmatrix}$$

```
In[*]:= A1 = A;
Do[A1[[i + 1, i]] = 0, {i, 2 n - 1}];
A1 // MatrixForm
```

Out[*]//MatrixForm=

$$\begin{pmatrix} -\frac{1}{T} & 0 & 0 & -1 + \frac{1}{T} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{1}{T} & 0 & 0 & 0 & 0 & -1 + \frac{1}{T} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -T & 0 & 0 & 0 & 0 & 0 & -1 + T & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -1 + \frac{1}{T} & 0 & 0 & 0 & 0 & -\frac{1}{T} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -T & 0 & 0 & 0 & 0 & 0 & -1 + T \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -T & 0 & 0 & -1 + T & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -1 + T & 0 & 0 & 0 & 0 & 0 & 0 & -T & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 + T & 0 & 0 & 0 & 0 & -T \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 \end{pmatrix}$$

```
In[*]:= Inverse[A1] // Simplify // MatrixForm
```

Out[*]//MatrixForm=

$$\begin{pmatrix} -T & 0 & 0 & -1+T & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -T & 0 & 0 & 0 & 0 & -1+T & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{1}{T} & 0 & 0 & 0 & 0 & 0 & 0 & -1+\frac{1}{T} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -1+T & 0 & 0 & 0 & 0 & -T & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{T} & 0 & 0 & 0 & 0 & 0 & -1+\frac{1}{T} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{T} & 0 & 0 & -1+\frac{1}{T} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -1+\frac{1}{T} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{T} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1+\frac{1}{T} & 0 & 0 & 0 & 0 & -\frac{1}{T} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 \end{pmatrix}$$

In[*]:= **G = Simplify@Prepend[Table[0, 2 n]] [Inverse[A]]; g α , β := G[[α , β]];**

G // MatrixForm

Out[=]//MatrixForm=

0	0	0	0	0	0	0
-1	$\frac{-1+T}{T}$	$-\frac{2-6T+8T^2-5T^3+T^4}{2-6T+9T^2-6T^3+2T^4}$	$-\frac{2-6T+8T^2-5T^3+T^4}{2T-6T^2+9T^3-6T^4+2T^5}$	$-\frac{(-1+T)^2(2-3T+2T^2)}{(2-2T+T^2)(1-2T+2T^2)}$	$-\frac{(-1+T)^2T(2-3T+2T^2)}{(2-2T+T^2)(1-2T+2T^2)}$	$-\frac{(-1+T)^2}{(2-2T+T^2)}$
-1	$-\frac{1}{T}$	$-\frac{2-6T+8T^2-5T^3+T^4}{2-6T+9T^2-6T^3+2T^4}$	$-\frac{2-6T+8T^2-5T^3+T^4}{2T-6T^2+9T^3-6T^4+2T^5}$	$-\frac{(-1+T)^2(2-3T+2T^2)}{(2-2T+T^2)(1-2T+2T^2)}$	$-\frac{(-1+T)^2T(2-3T+2T^2)}{(2-2T+T^2)(1-2T+2T^2)}$	$-\frac{(-1+T)^2}{(2-2T+T^2)}$
-1	$-\frac{1}{T}$	$\frac{-2+4T-4T^2+T^3}{(2-2T+T^2)(1-2T+2T^2)}$	$\frac{2(-1+T)(1-T+T^2)^2}{T(2-2T+T^2)(1-2T+2T^2)}$	$\frac{-2+5T-5T^2+2T^3}{(2-2T+T^2)(1-2T+2T^2)}$	$\frac{T(-2+5T-5T^2+2T^3)}{(2-2T+T^2)(1-2T+2T^2)}$	$\frac{(-1+T)(2-2T+T^2)}{(2-2T+T^2)}$
-1	$-\frac{1}{T}$	$\frac{-2+4T-4T^2+T^3}{(2-2T+T^2)(1-2T+2T^2)}$	$\frac{-2+4T-4T^2+T^3}{T(2-2T+T^2)(1-2T+2T^2)}$	$\frac{-2+5T-5T^2+2T^3}{(2-2T+T^2)(1-2T+2T^2)}$	$\frac{T(-2+5T-5T^2+2T^3)}{(2-2T+T^2)(1-2T+2T^2)}$	$\frac{(-1+T)(2-2T+T^2)}{(2-2T+T^2)}$
-1	$-\frac{1}{T}$	$\frac{-1+T-T^2}{1-2T+2T^2}$	$-\frac{1-T+T^2}{T-2T^2+2T^3}$	$\frac{-2+3T-2T^2}{1-2T+2T^2}$	$-\frac{(-1+T)^2(-1+2T)}{1-2T+2T^2}$	$-\frac{(-1+2T)}{1-2T}$
-1	$-\frac{1}{T}$	$\frac{-1+T-T^2}{1-2T+2T^2}$	$-\frac{1-T+T^2}{T-2T^2+2T^3}$	$\frac{-2+3T-2T^2}{1-2T+2T^2}$	$\frac{T(-2+3T-2T^2)}{1-2T+2T^2}$	$-\frac{(-1+2T)}{1-2T}$
-1	$-\frac{1}{T}$	$\frac{-2+6T-10T^2+8T^3-3T^4}{2-6T+9T^2-6T^3+2T^4}$	$\frac{-2+6T-10T^2+8T^3-3T^4}{T(2-6T+9T^2-6T^3+2T^4)}$	$\frac{-2+5T-7T^2+5T^3-2T^4}{2-6T+9T^2-6T^3+2T^4}$	$\frac{T(-2+5T-7T^2+5T^3-2T^4)}{(2-2T+T^2)(1-2T+2T^2)}$	$\frac{-2+6T-9T^2}{2-6T+9T^2}$
-1	$-\frac{1}{T}$	$\frac{-2+6T-10T^2+8T^3-3T^4}{2-6T+9T^2-6T^3+2T^4}$	$\frac{-2+6T-10T^2+8T^3-3T^4}{T(2-6T+9T^2-6T^3+2T^4)}$	$\frac{-2+5T-7T^2+5T^3-2T^4}{2-6T+9T^2-6T^3+2T^4}$	$\frac{T(-2+5T-7T^2+5T^3-2T^4)}{(2-2T+T^2)(1-2T+2T^2)}$	$\frac{-2+6T-9T^2}{2-6T+9T^2}$
-1	$-\frac{1}{T}$	$\frac{-2+5T-7T^2+5T^3-2T^4}{2-6T+9T^2-6T^3+2T^4}$	$\frac{-2+5T-7T^2+5T^3-2T^4}{T(2-6T+9T^2-6T^3+2T^4)}$	$\frac{-3+8T-10T^2+6T^3-2T^4}{2-6T+9T^2-6T^3+2T^4}$	$\frac{T(-3+8T-10T^2+6T^3-2T^4)}{(2-2T+T^2)(1-2T+2T^2)}$	$\frac{-2+6T-8T^2}{2-6T+9T^2}$
-1	$-\frac{1}{T}$	$\frac{-2+5T-7T^2+5T^3-2T^4}{2-6T+9T^2-6T^3+2T^4}$	$\frac{-2+5T-7T^2+5T^3-2T^4}{T(2-6T+9T^2-6T^3+2T^4)}$	$\frac{-3+8T-10T^2+6T^3-2T^4}{2-6T+9T^2-6T^3+2T^4}$	$\frac{T(-3+8T-10T^2+6T^3-2T^4)}{(2-2T+T^2)(1-2T+2T^2)}$	$\frac{-2+6T-8T^2}{2-6T+9T^2}$
-1	$-\frac{1}{T}$	$-\frac{2-4T+4T^2-2T^3+T^4}{2-6T+9T^2-6T^3+2T^4}$	$-\frac{2-4T+4T^2-2T^3+T^4}{2T-6T^2+9T^3-6T^4+2T^5}$	$\frac{-4+11T-13T^2+7T^3-2T^4}{2-6T+9T^2-6T^3+2T^4}$	$\frac{T(-4+11T-13T^2+7T^3-2T^4)}{(2-2T+T^2)(1-2T+2T^2)}$	$-\frac{2-6T+7T^2}{2-6T+9T^2}$
-1	$-\frac{1}{T}$	$-\frac{2-4T+4T^2-2T^3+T^4}{2-6T+9T^2-6T^3+2T^4}$	$-\frac{2-4T+4T^2-2T^3+T^4}{2T-6T^2+9T^3-6T^4+2T^5}$	$\frac{-4+11T-13T^2+7T^3-2T^4}{2-6T+9T^2-6T^3+2T^4}$	$\frac{T(-4+11T-13T^2+7T^3-2T^4)}{(2-2T+T^2)(1-2T+2T^2)}$	$-\frac{2-6T+7T^2}{2-6T+9T^2}$
-1	$-\frac{1}{T}$	$-\frac{2-5T+6T^2-3T^3+T^4}{2-6T+9T^2-6T^3+2T^4}$	$-\frac{2-5T+6T^2-3T^3+T^4}{2T-6T^2+9T^3-6T^4+2T^5}$	$\frac{-3+9T-12T^2+7T^3-2T^4}{2-6T+9T^2-6T^3+2T^4}$	$\frac{T(-3+9T-12T^2+7T^3-2T^4)}{(2-2T+T^2)(1-2T+2T^2)}$	$-\frac{2-6T+8T^2}{2-6T+9T^2}$
-1	$-\frac{1}{T}$	$-\frac{2-5T+6T^2-3T^3+T^4}{2-6T+9T^2-6T^3+2T^4}$	$-\frac{2-5T+6T^2-3T^3+T^4}{2T-6T^2+9T^3-6T^4+2T^5}$	$\frac{-3+9T-12T^2+7T^3-2T^4}{2-6T+9T^2-6T^3+2T^4}$	$\frac{T(-3+9T-12T^2+7T^3-2T^4)}{(2-2T+T^2)(1-2T+2T^2)}$	$-\frac{2-6T+8T^2}{2-6T+9T^2}$
-1	$-\frac{1}{T}$	-1	$-\frac{1}{T}$	-1	$-T$	$-$
-1	$-\frac{1}{T}$	-1	$-\frac{1}{T}$	-1	$-T$	$-$

```
In[*]:= G1 = Simplify@Inverse[A];
Do[G1[[i, i + 1]] == 1, {i, 2 n - 1}]
G1 // Simplify // MatrixForm
```

Out[*]//MatrixForm=

$$\begin{pmatrix} -1 & \frac{-1+T}{T} & -\frac{2-6T+8T^2-5T^3+T^4}{2-6T+9T^2-6T^3+2T^4} & -\frac{2-6T+8T^2-5T^3+T^4}{2T-6T^2+9T^3-6T^4+2T^5} & -\frac{(-1+T)^2(2-3T+2T^2)}{(2-2T+T^2)(1-2T+2T^2)} & -\frac{(-1+T)^2T(2-3T+2T^2)}{(2-2T+T^2)(1-2T+2T^2)} & -\frac{(-1+T)^2(2-3T+2T^2)}{(2-2T+T^2)(1-2T+2T^2)} \\ -1 & -\frac{1}{T} & -\frac{2-6T+8T^2-5T^3+T^4}{2-6T+9T^2-6T^3+2T^4} & -\frac{2-6T+8T^2-5T^3+T^4}{2T-6T^2+9T^3-6T^4+2T^5} & -\frac{(-1+T)^2(2-3T+2T^2)}{(2-2T+T^2)(1-2T+2T^2)} & -\frac{(-1+T)^2T(2-3T+2T^2)}{(2-2T+T^2)(1-2T+2T^2)} & -\frac{(-1+T)^2(2-3T+2T^2)}{(2-2T+T^2)(1-2T+2T^2)} \\ -1 & -\frac{1}{T} & \frac{-2+4T-4T^2+T^3}{(2-2T+T^2)(1-2T+2T^2)} & \frac{2(-1+T)(1-T+T^2)^2}{T(2-2T+T^2)(1-2T+2T^2)} & \frac{-2+5T-5T^2+2T^3}{(2-2T+T^2)(1-2T+2T^2)} & \frac{T(-2+5T-5T^2+2T^3)}{(2-2T+T^2)(1-2T+2T^2)} & \frac{(-1+T)(2-3T+2T^2)}{(2-2T+T^2)(1-2T+2T^2)} \\ -1 & -\frac{1}{T} & \frac{-2+4T-4T^2+T^3}{(2-2T+T^2)(1-2T+2T^2)} & \frac{-2+4T-4T^2+T^3}{T(2-2T+T^2)(1-2T+2T^2)} & \frac{-2+5T-5T^2+2T^3}{(2-2T+T^2)(1-2T+2T^2)} & \frac{T(-2+5T-5T^2+2T^3)}{(2-2T+T^2)(1-2T+2T^2)} & \frac{(-1+T)(2-3T+2T^2)}{(2-2T+T^2)(1-2T+2T^2)} \\ -1 & -\frac{1}{T} & \frac{-1+T-T^2}{1-2T+2T^2} & -\frac{1-T+T^2}{T-2T^2+2T^3} & \frac{-2+3T-2T^2}{1-2T+2T^2} & -\frac{(-1+T)^2(-1+2T)}{1-2T+2T^2} & -\frac{(-1+T)^2(-1+2T)}{1-2T+2T^2} \\ -1 & -\frac{1}{T} & \frac{-1+T-T^2}{1-2T+2T^2} & -\frac{1-T+T^2}{T-2T^2+2T^3} & \frac{-2+3T-2T^2}{1-2T+2T^2} & \frac{T(-2+3T-2T^2)}{1-2T+2T^2} & -\frac{(-1+T)^2(-1+2T)}{1-2T+2T^2} \\ -1 & -\frac{1}{T} & \frac{-2+6T-10T^2+8T^3-3T^4}{2-6T+9T^2-6T^3+2T^4} & \frac{-2+6T-10T^2+8T^3-3T^4}{T(2-6T+9T^2-6T^3+2T^4)} & \frac{-2+5T-7T^2+5T^3-2T^4}{2-6T+9T^2-6T^3+2T^4} & \frac{T(-2+5T-7T^2+5T^3-2T^4)}{(2-2T+T^2)(1-2T+2T^2)} & \frac{-2+6T-9T^2}{2-6T+9T^2} \\ -1 & -\frac{1}{T} & \frac{-2+6T-10T^2+8T^3-3T^4}{2-6T+9T^2-6T^3+2T^4} & \frac{-2+6T-10T^2+8T^3-3T^4}{T(2-6T+9T^2-6T^3+2T^4)} & \frac{-2+5T-7T^2+5T^3-2T^4}{2-6T+9T^2-6T^3+2T^4} & \frac{T(-2+5T-7T^2+5T^3-2T^4)}{(2-2T+T^2)(1-2T+2T^2)} & \frac{-2+6T-9T^2}{2-6T+9T^2} \\ -1 & -\frac{1}{T} & \frac{-2+5T-7T^2+5T^3-2T^4}{2-6T+9T^2-6T^3+2T^4} & \frac{-2+5T-7T^2+5T^3-2T^4}{T(2-6T+9T^2-6T^3+2T^4)} & \frac{-3+8T-10T^2+6T^3-2T^4}{2-6T+9T^2-6T^3+2T^4} & \frac{T(-3+8T-10T^2+6T^3-2T^4)}{(2-2T+T^2)(1-2T+2T^2)} & \frac{-2+6T-8T^2}{2-6T+9T^2} \\ -1 & -\frac{1}{T} & \frac{-2+5T-7T^2+5T^3-2T^4}{2-6T+9T^2-6T^3+2T^4} & \frac{-2+5T-7T^2+5T^3-2T^4}{T(2-6T+9T^2-6T^3+2T^4)} & \frac{-3+8T-10T^2+6T^3-2T^4}{2-6T+9T^2-6T^3+2T^4} & \frac{T(-3+8T-10T^2+6T^3-2T^4)}{(2-2T+T^2)(1-2T+2T^2)} & \frac{-2+6T-8T^2}{2-6T+9T^2} \\ -1 & -\frac{1}{T} & -\frac{2-4T+4T^2-2T^3+T^4}{2-6T+9T^2-6T^3+2T^4} & -\frac{2-4T+4T^2-2T^3+T^4}{2T-6T^2+9T^3-6T^4+2T^5} & \frac{-4+11T-13T^2+7T^3-2T^4}{2-6T+9T^2-6T^3+2T^4} & \frac{T(-4+11T-13T^2+7T^3-2T^4)}{(2-2T+T^2)(1-2T+2T^2)} & -\frac{2-6T+7T^2}{2-6T+9T^2} \\ -1 & -\frac{1}{T} & -\frac{2-4T+4T^2-2T^3+T^4}{2-6T+9T^2-6T^3+2T^4} & -\frac{2-4T+4T^2-2T^3+T^4}{2T-6T^2+9T^3-6T^4+2T^5} & \frac{-4+11T-13T^2+7T^3-2T^4}{2-6T+9T^2-6T^3+2T^4} & \frac{T(-4+11T-13T^2+7T^3-2T^4)}{(2-2T+T^2)(1-2T+2T^2)} & -\frac{2-6T+7T^2}{2-6T+9T^2} \\ -1 & -\frac{1}{T} & -\frac{2-5T+6T^2-3T^3+T^4}{2-6T+9T^2-6T^3+2T^4} & -\frac{2-5T+6T^2-3T^3+T^4}{2T-6T^2+9T^3-6T^4+2T^5} & \frac{-3+9T-12T^2+7T^3-2T^4}{2-6T+9T^2-6T^3+2T^4} & \frac{T(-3+9T-12T^2+7T^3-2T^4)}{(2-2T+T^2)(1-2T+2T^2)} & -\frac{2-6T+8T^2}{2-6T+9T^2} \\ -1 & -\frac{1}{T} & -\frac{2-5T+6T^2-3T^3+T^4}{2-6T+9T^2-6T^3+2T^4} & -\frac{2-5T+6T^2-3T^3+T^4}{2T-6T^2+9T^3-6T^4+2T^5} & \frac{-3+9T-12T^2+7T^3-2T^4}{2-6T+9T^2-6T^3+2T^4} & \frac{T(-3+9T-12T^2+7T^3-2T^4)}{(2-2T+T^2)(1-2T+2T^2)} & -\frac{2-6T+8T^2}{2-6T+9T^2} \\ -1 & -\frac{1}{T} & -1 & -\frac{1}{T} & -1 & -T & - \\ -1 & -\frac{1}{T} & -1 & -\frac{1}{T} & -1 & -T & - \end{pmatrix}$$

In[*]:= **Inverse[G1] // Simplify // MatrixForm**

Out[*]//MatrixForm=

$$\begin{pmatrix} -\frac{1}{T} & 0 & 0 & -1 + \frac{1}{T} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 1 & -1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 1 & -\frac{1}{T} & 0 & 0 & 0 & 0 & -1 + \frac{1}{T} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & -1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 & -T & 0 & 0 & 0 & 0 & 0 & -1 + T & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 & -1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -1 + \frac{1}{T} & 0 & 0 & 0 & 1 & -\frac{1}{T} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 1 & -1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & -T & 0 & 0 & 0 & 0 & 0 & 0 & -1 + T \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & -1 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & -T & 0 & 0 & -1 + T & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & -1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -1 + T & 0 & 0 & 0 & 0 & 0 & 1 & -T & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & -1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 + T & 0 & 0 & 0 & 1 & -T & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & -1 \end{pmatrix}$$