Simple-minded matrix book-keeping

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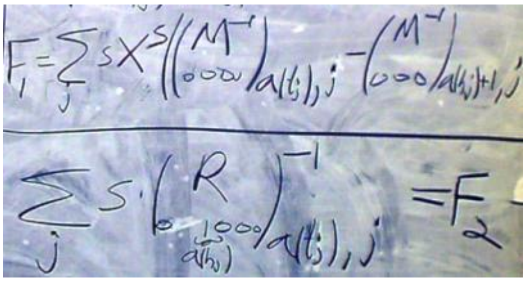
Why is it that the two programs below produce the same output, up to an additive constant term?

Program 1: (Alexander-Wirtinger) $/F_1$

```
R[gd_GD] := Module[
  {n, mat, arcs, k},
  n = Length[gd]; arcs = Arcs[gd];
  mat = Table[0, {n}, {n + 1}];
  k = 0; gd /. Ar[t_, h_, s_] :> {
      mat[[++k, arcs[[h]]]] = -1;  mat[[k, arcs[[t]]]] = 1 - X^s;
      mat[[k, arcs[[h]] + 1]] = X^s
    };
  mat
];
IM = Append[Inverse[Drop[R[gd], None, -1]], Table[0, {n}]];
j = 0;
Simplify[Expand[Plus @@ (gd /. Ar[t_, h_, s_] :>
    (++j; (IM[[arcs[[t]], j]] - IM[[arcs[[h]] + 1, j]]) s X^s)
)]]
```

Program 2 (tail scattering towards the head): $/F_2$

```
EZ2[gd_GD] := Module[
  {n, r, arcs, j},
  n = Length[gd];  r = R[gd];
  arcs = Arcs[gd];
  j = 0;  Simplify[Plus @@ (
    gd /. Ar[t_, h_, s_] :>
      s*Inverse[Append[r, e[n + 1, arcs[[h]]]]][[
        arcs[[t]], ++j
      ]]
    )]
];
```



BBS/sep 7.

$R=(M \mid c_{n+1})$

$(n)\times(n+1)$ must append a row of zeros.

$$F_1=\sum_j s_j X^{s_j}\, tr\begin{pmatrix}R\\e_{n+1}\end{pmatrix}^{-1}_{(n+1)\times(n+1)}\left[\begin{pmatrix} & 1 & & -1 & \\ & \uparrow & & \uparrow & \\ & a(t_j) & & a(h_j)+1 & \end{pmatrix} j\right]$$

$$F_2=\sum_j s_j\, tr\begin{pmatrix}R\\e_{a(h_j)}\end{pmatrix}^{-1}\begin{pmatrix}1\cdots\\ \vdots\\ a(t_j)\end{pmatrix} j$$

Can I go back from this to a sweeping strategy?

Is this really equal to the blackboard stuff?

..... Seems so.

Likely, the right approach isn't to mess with minors, but rather, to modify the sweeping strategy.

"cleansing"? "tabbing"?

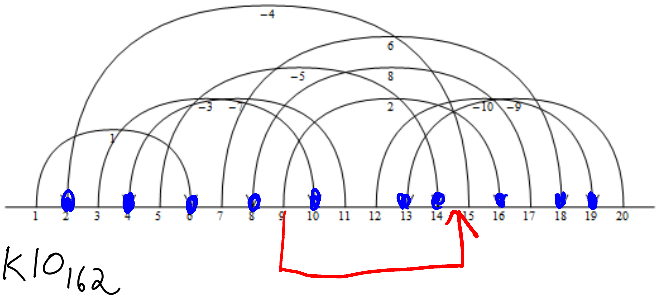
Is the Alexander for rounds equal to the Alexander for longs?

$R(\,\vdots\,)=0$

$$R=\left(\begin{array}{c|c|c} a & N & b\\ \hline c & d & e\end{array}\right) \qquad \det\left(N\right)\overset{?}{=}\det\left(\begin{array}{c|c}N & b\\ \hline d & e\end{array}\right)$$

Why are all minors of the Alexander matrix for round knots equal up to units?

$$\begin{pmatrix}
1-X & 0 & -1 & X & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 1-X & 0 & 0 & -1 & X & 0 \\
0 & 1-\frac{1}{x} & 0 & 0 & -1 & \frac{1}{x} & 0 & 0 & 0 & 0 \\
-1 & \frac{1}{x} & 0 & 0 & 0 & 0 & 0 & 1-\frac{1}{x} & 0 & 0 \\
0 & 0 & 1-\frac{1}{x} & 0 & 0 & 0 & -1 & \frac{1}{x} & 0 & 0 \\
0 & 0 & 0 & 1-X & 0 & 0 & 0 & 0 & -1 & X \\
0 & -1 & \frac{1}{x} & 0 & 0 & 1-\frac{1}{x} & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & -1 & X & 0 & 0 & 0 & 1-X & 0 \\
1-\frac{1}{x} & 0 & 0 & 0 & 0 & -1 & \frac{1}{x} & 0 & 0 & 0 \\
\frac{1}{x} & 0 & 0 & 0 & 0 & 1-\frac{1}{x} & 0 & 0 & 0 & -1
\end{pmatrix}$$



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