

pdf

Pensieve header: The WG Algebra with care for conjugacy invariant sets and for tangles.

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In[ ]:=
Once[<< KnotTheory`;
HL[ $\mathcal{E}_-$ ] := Style[ $\mathcal{E}$ , Background  $\rightarrow$  If[TrueQ@ $\mathcal{E}$ , ■, ■]];
 $\chi$ [cond_] := If[TrueQ[cond], 1, 0];
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Loading **KnotTheory`** version of February 2, 2020, 10:53:45.2097.
Read more at <http://katlas.org/wiki/KnotTheory>.

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```
In[ ]:=
DeclareGroup [G_Symbol, Sn] := Module [{ $\alpha$ ,  $\beta$ , e},
  G /: Ord[G] = n!;
  G /: Elements [G] = PermutationCycles /@ (Permutations@Range@n);
  Do[G /: g[G,  $\alpha$ ] = e = Elements [G][[ $\alpha$ ]]; G /: ind[G, e] =  $\alpha$ ,
    { $\alpha$ , Ord[G]}];
  Do[G /: m[G,  $\alpha$ ,  $\beta$ ] = ind[G, g[G,  $\alpha$ ]~PermutationProduct~g[G,  $\beta$ ]],
    { $\alpha$ , Ord[G]}, { $\beta$ , Ord[G]}];
  Do[G /: inv[G,  $\alpha$ ] = ind[G, InversePermutation[g[G,  $\alpha$ ]]],
    { $\alpha$ , Ord[G]}] ]
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In[ ]:=
ConjugacyClasses [G_Symbol] := Module [{sea = Range@Ord@G, ccs = {}, cc},
  While[Length@sea > 0,
    cc = Union[Table[m[G, inv[G,  $\alpha$ ], m[G, First@sea,  $\alpha$ ]], { $\alpha$ , Ord@G}}];
    AppendTo[ccs, cc];
    sea = Complement[sea, cc];
  ]; ccs]
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In[ ]:=
g[ $\alpha_-$ ] := g[$G,  $\alpha$ ]; ind[ $\alpha_-$ ] := ind[$G,  $\alpha$ ];
m[ $\alpha_-$ ,  $\beta_-$ ] := m[$G,  $\alpha$ ,  $\beta$ ]; inv[ $\alpha_-$ ] := inv[$G,  $\alpha$ ];
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In[ ]:=
m $i$ ,  $j \rightarrow k$ [ $\mathcal{E}_-$ ] := Expand [ $\mathcal{E}$ ] /. W $i$ [ $\alpha_-$ ,  $\beta_-$ ] W $j$ [ $\gamma_-$ ,  $\delta_-$ ]  $\Rightarrow$   $\chi$ [m[ $\alpha$ ,  $\beta$ ] == m[ $\beta$ ,  $\gamma$ ]] W $k$ [ $\alpha$ , m[ $\beta$ ,  $\delta$ ]]
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In[ ]:=
(* $CIS is a Conjugation Invariant Set *)
R $i$ ,  $j$  := Sum[W $i$ [ $\alpha$ , 1] W $j$ [ $\beta$ ,  $\alpha$ ], { $\alpha$ , $CIS}, { $\beta$ , $CIS}];
R $i$ ,  $j$  $\bar{}$  := Sum[W $i$ [ $\alpha$ , 1] W $j$ [ $\beta$ , inv@ $\alpha$ ], { $\alpha$ , $CIS}, { $\beta$ , $CIS}];
 $\eta$  $i$  := Sum[W $i$ [ $\alpha$ , 1], { $\alpha$ , $CIS}];
```

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```
In[ ]:= DeclareGroup[$G = S3, S3];
Table[m[i, j], {i, Ord[$G]}, {j, Ord[$G]}] // MatrixForm
```

Out[]:=**MatrixForm**=

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$$\begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 \\ 2 & 1 & 4 & 3 & 6 & 5 \\ 3 & 5 & 1 & 6 & 2 & 4 \\ 4 & 6 & 2 & 5 & 1 & 3 \\ 5 & 3 & 6 & 1 & 4 & 2 \\ 6 & 4 & 5 & 2 & 3 & 1 \end{pmatrix}$$

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In[ ]:= Elements[$G]
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Out[ ]:= {Cycles[{}], Cycles[{{2, 3}}], Cycles[{{1, 2}}],
Cycles[{{1, 2, 3}}], Cycles[{{1, 3, 2}}], Cycles[{{1, 3}}]}
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```
In[ ]:= ConjugacyClasses[$G]
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```
Out[ ]:= {{1}, {2, 3, 6}, {4, 5}}
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```
In[ ]:= Table[{
Short[lhs = R1,2 R4,3 R5,6 // m1,4→1 // m2,5→2 // m3,6→3,
rhs = R2,3 R1,4 R5,6 // m1,5→1 // m2,6→2 // m3,4→3; HL[lhs == rhs]],
{$CIS, ConjugacyClasses[$G]}]
```

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```
Out[ ]:= {{W1[1, 1] W2[1, 1] W3[1, 1], True},
{W1[2, 1] W2[2, 2] W3[2, 1] + W1[3, 1] W2[3, 3] W3[2, 1] + <<23>> +
W1[2, 1] W2[3, 2] W3[6, 5] + W1[3, 1] W2[6, 3] W3[6, 5], True},
{W1[5, 1] W2[4, 5] W3[4, 1] + W1[4, 1] W2[5, 4] W3[4, 1] + <<1>> + <<1>> + <<1>> +
<<1>> + W1[5, 1] W2[5, 5] W3[5, 4] + W1[4, 1] W2[4, 4] W3[5, 5], True}}
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```
In[ ]:= Table[
lhs = R1,2  $\bar{R}$ 3,4 // m1,3→1 // m2,4→2; rhs = η1 η2 // Expand; HL[lhs == rhs],
{$CIS, ConjugacyClasses[$G]}]
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Out[ ]:= {True, True, True}
```

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```
In[ ]:= Table[
lhs = R1,2  $\bar{R}$ 3,4 // m1,3→1 // m4,2→2; rhs = η1 η2 // Expand; HL[lhs == rhs],
{$CIS, ConjugacyClasses[$G]}]
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Out[ ]:= {True, True, True}
```

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```
In[ ]:= Z[K_] := Module[{z}, Sum[
  z = Expand[Times @@ PD[K] /. x : X[i_, j_, k_, L_] => If[PositiveQ[x], RL,i,  $\bar{R}_{j,i}$ ]];
  Do[z = z // mc[[1],c[[j]]->c[[1]], {c, Skeleton[K]}, {j, 2, Length@c}];
  z,
  {$CIS, ConjugacyClasses[$G]}]]
```

```
In[ ]:= tab = Table[Echo@Timing[K -> Z[K]], {K, AllKnots[{3, 7}]}];
  >> {0.03125, Knot[3, 1] -> W1[1, 1] + 3 W1[2, 2] + 3 W1[3, 3] + W1[4, 1] + W1[5, 1] + 3 W1[6, 6]}
  >> {0.375, Knot[4, 1] -> W1[1, 1] + W1[2, 1] + W1[3, 1] + W1[4, 1] + W1[5, 1] + W1[6, 1]}
  >> {2.625, Knot[5, 1] -> W1[1, 1] + W1[2, 2] + W1[3, 3] + W1[4, 4] + W1[5, 5] + W1[6, 6]}
  >> {2.98438, Knot[5, 2] -> W1[1, 1] + W1[2, 2] + W1[3, 3] + W1[4, 4] + W1[5, 5] + W1[6, 6]}
  >> {23.7031, Knot[6, 1] -> W1[1, 1] + 3 W1[2, 1] + 3 W1[3, 1] + W1[4, 4] + W1[5, 5] + 3 W1[6, 1]}
  >> {21.0313, Knot[6, 2] -> W1[1, 1] + W1[2, 1] + W1[3, 1] + W1[4, 4] + W1[5, 5] + W1[6, 1]}
  >> {20.7344, Knot[6, 3] -> W1[1, 1] + W1[2, 1] + W1[3, 1] + W1[4, 1] + W1[5, 1] + W1[6, 1]}
  >> {195.656, Knot[7, 1] -> W1[1, 1] + W1[2, 2] + W1[3, 3] + W1[4, 5] + W1[5, 4] + W1[6, 6]}
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Out[]:= \$Aborted

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Edge-vertex convention: an oriented edge carries the same label as the vertex ending it.

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In[ ]:= ZF[K_] := ZF[PD@K];
ZF[pd_PD] := Module[{z, done, st, c, mn, k},
  Sum[
    z = 1; done = {}; st = Range[2 Length@pd];
    Do[
      z *= c /. X[i_, j_, _, L_] => If[PositiveQ[c, mn = {i, L}]; RL,i, mn = {i, j};  $\bar{R}_{j,i}$ ];
      Do[
        If[MemberQ[done, k + 1], z = z // mk,k+1->k; st = st /. k + 1 -> k];
        If[MemberQ[done, k - 1], z = z // mst[[k-1],k->st[[k-1]]; st = st /. k -> st[[k-1]]];
        {k, mn}];
      done = done ∪ mn,
      {c, List @@ pd}];
    z,
    {$CIS, ConjugacyClasses[$G]}]]
```

```
In[ ]:= tab = Table[Echo@Timing[K -> ZF[K]], {K, AllKnots[{3, 9}]}];
  >> {0.015625, Knot[3, 1] -> W1[1, 1] + 3 W1[2, 2] + 3 W1[3, 3] + W1[4, 1] + W1[5, 1] + 3 W1[6, 6]}
  >> {0., Knot[4, 1] -> W1[1, 1] + W1[2, 1] + W1[3, 1] + W1[4, 1] + W1[5, 1] + W1[6, 1]}
  >> {0.09375, Knot[5, 1] -> W1[1, 1] + W1[2, 2] + W1[3, 3] + W1[4, 4] + W1[5, 5] + W1[6, 6]}
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- » $\{0.015625, \text{Knot}[5, 2] \rightarrow W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 4] + W_1[5, 5] + W_1[6, 6]\}$
- » $\{0.046875, \text{Knot}[6, 1] \rightarrow W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 4] + W_1[5, 5] + 3 W_1[6, 1]\}$
- » $\{0.03125, \text{Knot}[6, 2] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 4] + W_1[5, 5] + W_1[6, 1]\}$
- » $\{0.046875, \text{Knot}[6, 3] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + W_1[6, 1]\}$
- » $\{0.828125, \text{Knot}[7, 1] \rightarrow W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 5] + W_1[5, 4] + W_1[6, 6]\}$
- » $\{0.28125, \text{Knot}[7, 2] \rightarrow W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 5] + W_1[5, 4] + W_1[6, 6]\}$
- » $\{0.21875, \text{Knot}[7, 3] \rightarrow W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 4] + W_1[5, 5] + W_1[6, 6]\}$
- » $\{0.046875, \text{Knot}[7, 4] \rightarrow W_1[1, 1] + 3 W_1[2, 2] + 3 W_1[3, 3] + W_1[4, 4] + W_1[5, 5] + 3 W_1[6, 6]\}$
- » $\{0.296875, \text{Knot}[7, 5] \rightarrow W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 5] + W_1[5, 4] + W_1[6, 6]\}$
- » $\{0.15625, \text{Knot}[7, 6] \rightarrow W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 1] + W_1[5, 1] + W_1[6, 6]\}$
- » $\{0.046875, \text{Knot}[7, 7] \rightarrow W_1[1, 1] + 3 W_1[2, 2] + 3 W_1[3, 3] + W_1[4, 4] + W_1[5, 5] + 3 W_1[6, 6]\}$
- » $\{0.1875, \text{Knot}[8, 1] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + W_1[6, 1]\}$
- » $\{0.1875, \text{Knot}[8, 2] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + W_1[6, 1]\}$
- » $\{0.359375, \text{Knot}[8, 3] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + W_1[6, 1]\}$
- » $\{0.1875, \text{Knot}[8, 4] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + W_1[6, 1]\}$
- » $\{0.0625, \text{Knot}[8, 5] \rightarrow W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 4] + W_1[5, 5] + 3 W_1[6, 1]\}$
- » $\{0.15625, \text{Knot}[8, 6] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + W_1[6, 1]\}$
- » $\{0.375, \text{Knot}[8, 7] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + W_1[6, 1]\}$
- » $\{0.234375, \text{Knot}[8, 8] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + W_1[6, 1]\}$
- » $\{0.125, \text{Knot}[8, 9] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + W_1[6, 1]\}$
- » $\{0.21875, \text{Knot}[8, 10] \rightarrow W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + 3 W_1[6, 1]\}$
- » $\{0.0625, \text{Knot}[8, 11] \rightarrow W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + 3 W_1[6, 1]\}$
- » $\{0.078125, \text{Knot}[8, 12] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + W_1[6, 1]\}$
- » $\{0.109375, \text{Knot}[8, 13] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + W_1[6, 1]\}$
- » $\{0.0625, \text{Knot}[8, 14] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + W_1[6, 1]\}$
- » $\{0.21875, \text{Knot}[8, 15] \rightarrow W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 4] + W_1[5, 5] + 3 W_1[6, 1]\}$
- » $\{0.421875, \text{Knot}[8, 16] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 4] + W_1[5, 5] + W_1[6, 1]\}$
- » $\{0.046875, \text{Knot}[8, 17] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + W_1[6, 1]\}$
- » $\{0.625, \text{Knot}[8, 18] \rightarrow W_1[1, 1] + 9 W_1[2, 1] + 9 W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + 9 W_1[6, 1]\}$
- » $\{0.21875, \text{Knot}[8, 19] \rightarrow W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + 3 W_1[6, 1]\}$
- » $\{0.203125, \text{Knot}[8, 20] \rightarrow W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 4] + W_1[5, 5] + 3 W_1[6, 1]\}$
- » $\{0.28125, \text{Knot}[8, 21] \rightarrow W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + 3 W_1[6, 1]\}$
- » $\{11.7188, \text{Knot}[9, 1] \rightarrow W_1[1, 1] + 3 W_1[2, 2] + 3 W_1[3, 3] + W_1[4, 1] + W_1[5, 1] + 3 W_1[6, 6]\}$
- » $\{3.92188, \text{Knot}[9, 2] \rightarrow W_1[1, 1] + 3 W_1[2, 2] + 3 W_1[3, 3] + W_1[4, 1] + W_1[5, 1] + 3 W_1[6, 6]\}$
- » $\{1.45313, \text{Knot}[9, 3] \rightarrow W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 1] + W_1[5, 1] + W_1[6, 6]\}$
- » $\{1.8125, \text{Knot}[9, 4] \rightarrow W_1[1, 1] + 3 W_1[2, 2] + 3 W_1[3, 3] + W_1[4, 1] + W_1[5, 1] + 3 W_1[6, 6]\}$

- » {0.375, Knot [9, 5] → $W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 1] + W_1[5, 1] + W_1[6, 6]$ }
- » {3.28125, Knot [9, 6] → $W_1[1, 1] + 3 W_1[2, 2] + 3 W_1[3, 3] + W_1[4, 1] + W_1[5, 1] + 3 W_1[6, 6]$ }
- » {0.609375, Knot [9, 7] → $W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 1] + W_1[5, 1] + W_1[6, 6]$ }
- » {1.3125, Knot [9, 8] → $W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 5] + W_1[5, 4] + W_1[6, 6]$ }
- » {1.20313, Knot [9, 9] → $W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 1] + W_1[5, 1] + W_1[6, 6]$ }
- » {0.25, Knot [9, 10] → $W_1[1, 1] + 3 W_1[2, 2] + 3 W_1[3, 3] + W_1[4, 1] + W_1[5, 1] + 3 W_1[6, 6]$ }
- » {0.171875, Knot [9, 11] → $W_1[1, 1] + 3 W_1[2, 2] + 3 W_1[3, 3] + W_1[4, 5] + W_1[5, 4] + 3 W_1[6, 6]$ }
- » {0.46875, Knot [9, 12] → $W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 4] + W_1[5, 5] + W_1[6, 6]$ }
- » {0.25, Knot [9, 13] → $W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 1] + W_1[5, 1] + W_1[6, 6]$ }
- » {0.125, Knot [9, 14] → $W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 1] + W_1[5, 1] + W_1[6, 6]$ }
- » {0.109375, Knot [9, 15] → $W_1[1, 1] + 3 W_1[2, 2] + 3 W_1[3, 3] + W_1[4, 5] + W_1[5, 4] + 3 W_1[6, 6]$ }
- » {0.421875, Knot [9, 16] → $W_1[1, 1] + 3 W_1[2, 2] + 3 W_1[3, 3] + W_1[4, 1] + W_1[5, 1] + 3 W_1[6, 6]$ }
- » {0.0625, Knot [9, 17] → $W_1[1, 1] + 3 W_1[2, 2] + 3 W_1[3, 3] + W_1[4, 5] + W_1[5, 4] + 3 W_1[6, 6]$ }
- » {0.75, Knot [9, 18] → $W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 1] + W_1[5, 1] + W_1[6, 6]$ }
- » {0.09375, Knot [9, 19] → $W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 5] + W_1[5, 4] + W_1[6, 6]$ }
- » {1.21875, Knot [9, 20] → $W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 4] + W_1[5, 5] + W_1[6, 6]$ }
- » {0.078125, Knot [9, 21] → $W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 5] + W_1[5, 4] + W_1[6, 6]$ }
- » {0.046875, Knot [9, 22] → $W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 4] + W_1[5, 5] + W_1[6, 6]$ }
- » {1.53125, Knot [9, 23] → $W_1[1, 1] + 3 W_1[2, 2] + 3 W_1[3, 3] + W_1[4, 1] + W_1[5, 1] + 3 W_1[6, 6]$ }
- » {1.09375, Knot [9, 24] → $W_1[1, 1] + 3 W_1[2, 2] + 3 W_1[3, 3] + W_1[4, 5] + W_1[5, 4] + 3 W_1[6, 6]$ }
- » {0.546875, Knot [9, 25] → $W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 4] + W_1[5, 5] + W_1[6, 6]$ }
- » {0.109375, Knot [9, 26] → $W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 1] + W_1[5, 1] + W_1[6, 6]$ }
- » {0.4375, Knot [9, 27] → $W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 5] + W_1[5, 4] + W_1[6, 6]$ }
- » {0.421875, Knot [9, 28] → $W_1[1, 1] + 3 W_1[2, 2] + 3 W_1[3, 3] + W_1[4, 1] + W_1[5, 1] + 3 W_1[6, 6]$ }
- » {0.21875, Knot [9, 29] → $W_1[1, 1] + 3 W_1[2, 2] + 3 W_1[3, 3] + W_1[4, 5] + W_1[5, 4] + 3 W_1[6, 6]$ }
- » {0.09375, Knot [9, 30] → $W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 5] + W_1[5, 4] + W_1[6, 6]$ }
- » {0.1875, Knot [9, 31] → $W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 1] + W_1[5, 1] + W_1[6, 6]$ }
- » {0.1875, Knot [9, 32] → $W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 1] + W_1[5, 1] + W_1[6, 6]$ }
- » {0.109375, Knot [9, 33] → $W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 5] + W_1[5, 4] + W_1[6, 6]$ }
- » {0.0625, Knot [9, 34] → $W_1[1, 1] + 3 W_1[2, 2] + 3 W_1[3, 3] + W_1[4, 5] + W_1[5, 4] + 3 W_1[6, 6]$ }
- » {0.453125, Knot [9, 35] → $W_1[1, 1] + 9 W_1[2, 2] + 9 W_1[3, 3] + W_1[4, 1] + W_1[5, 1] + 9 W_1[6, 6]$ }
- » {0.09375, Knot [9, 36] → $W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 5] + W_1[5, 4] + W_1[6, 6]$ }
- » {0.15625, Knot [9, 37] → $W_1[1, 1] + 9 W_1[2, 2] + 9 W_1[3, 3] + W_1[4, 5] + W_1[5, 4] + 9 W_1[6, 6]$ }
- » {0.40625, Knot [9, 38] → $W_1[1, 1] + 3 W_1[2, 2] + 3 W_1[3, 3] + W_1[4, 1] + W_1[5, 1] + 3 W_1[6, 6]$ }
- » {1.60938, Knot [9, 39] → $W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 5] + W_1[5, 4] + W_1[6, 6]$ }
- » {0.125, Knot [9, 40] → $W_1[1, 1] + 3 W_1[2, 2] + 3 W_1[3, 3] + W_1[4, 1] + W_1[5, 1] + 3 W_1[6, 6]$ }

- » {0.265625, Knot [9, 41] → $W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 1] + W_1[5, 1] + W_1[6, 6]$ }
- » {0.078125, Knot [9, 42] → $W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 4] + W_1[5, 5] + W_1[6, 6]$ }
- » {0.09375, Knot [9, 43] → $W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 5] + W_1[5, 4] + W_1[6, 6]$ }
- » {0.09375, Knot [9, 44] → $W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 5] + W_1[5, 4] + W_1[6, 6]$ }
- » {0.09375, Knot [9, 45] → $W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 4] + W_1[5, 5] + W_1[6, 6]$ }
- » {0.125, Knot [9, 46] → $W_1[1, 1] + 9 W_1[2, 2] + 9 W_1[3, 3] + W_1[4, 1] + W_1[5, 1] + 9 W_1[6, 6]$ }
- » {0.0625, Knot [9, 47] → $W_1[1, 1] + 9 W_1[2, 2] + 9 W_1[3, 3] + W_1[4, 1] + W_1[5, 1] + 9 W_1[6, 6]$ }
- » {0.15625, Knot [9, 48] → $W_1[1, 1] + 9 W_1[2, 2] + 9 W_1[3, 3] + W_1[4, 5] + W_1[5, 4] + 9 W_1[6, 6]$ }
- » {0.34375, Knot [9, 49] → $W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 1] + W_1[5, 1] + W_1[6, 6]$ }

pdf

In[]:=

```
ThinPosition[K_] := Module[{todo, done, pd, c},
  todo = List@@PD@K; done = {}; pd = PD[];
  While[todo != {},
    AppendTo[pd, c = RandomChoice@MaximalBy[todo, Length[done ∩ List@@#] &]];
    todo = DeleteCases[todo, c];
    done = done ∪ List@@c;
  pd
]
```

In[]:= ThinPosition[Knot[3, 1]]

Out[]:= PD[X[1, 4, 2, 5], X[5, 2, 6, 3], X[3, 6, 4, 1]]

pdf

In[]:=

```
ZEF[K_] := ZF@ThinPosition@K;
```

In[]:= tab = Table[Echo@Timing[K → ZEF[K]], {K, AllKnots[{3, 10}]}];

KnotTheory: Loading precomputed data in PD4Knots`.

- » {0.0625, Knot [3, 1] → $W_1[1, 1] + 3 W_1[2, 2] + 3 W_1[3, 3] + W_1[4, 1] + W_1[5, 1] + 3 W_1[6, 6]$ }
- » {0.015625, Knot [4, 1] → $W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + W_1[6, 1]$ }
- » {0.015625, Knot [5, 1] → $W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 4] + W_1[5, 5] + W_1[6, 6]$ }
- » {0.015625, Knot [5, 2] → $W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 4] + W_1[5, 5] + W_1[6, 6]$ }
- » {0.03125, Knot [6, 1] → $W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 4] + W_1[5, 5] + 3 W_1[6, 1]$ }
- » {0.015625, Knot [6, 2] → $W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 4] + W_1[5, 5] + W_1[6, 1]$ }
- » {0.015625, Knot [6, 3] → $W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + W_1[6, 1]$ }
- » {0.015625, Knot [7, 1] → $W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 5] + W_1[5, 4] + W_1[6, 6]$ }
- » {0.015625, Knot [7, 2] → $W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 5] + W_1[5, 4] + W_1[6, 6]$ }
- » {0.015625, Knot [7, 3] → $W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 4] + W_1[5, 5] + W_1[6, 6]$ }
- » {0.03125, Knot [7, 4] → $W_1[1, 1] + 3 W_1[2, 2] + 3 W_1[3, 3] + W_1[4, 4] + W_1[5, 5] + 3 W_1[6, 6]$ }
- » {0.015625, Knot [7, 5] → $W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 5] + W_1[5, 4] + W_1[6, 6]$ }
- » {0.03125, Knot [7, 6] → $W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 1] + W_1[5, 1] + W_1[6, 6]$ }

- » $\{0.03125, \text{Knot}[7, 7] \rightarrow W_1[1, 1] + 3 W_1[2, 2] + 3 W_1[3, 3] + W_1[4, 4] + W_1[5, 5] + 3 W_1[6, 6]\}$
- » $\{0.015625, \text{Knot}[8, 1] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + W_1[6, 1]\}$
- » $\{0.015625, \text{Knot}[8, 2] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + W_1[6, 1]\}$
- » $\{0.015625, \text{Knot}[8, 3] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + W_1[6, 1]\}$
- » $\{0.03125, \text{Knot}[8, 4] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + W_1[6, 1]\}$
- » $\{0.015625, \text{Knot}[8, 5] \rightarrow W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 4] + W_1[5, 5] + 3 W_1[6, 1]\}$
- » $\{0.03125, \text{Knot}[8, 6] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + W_1[6, 1]\}$
- » $\{0.015625, \text{Knot}[8, 7] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + W_1[6, 1]\}$
- » $\{0.03125, \text{Knot}[8, 8] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + W_1[6, 1]\}$
- » $\{0.046875, \text{Knot}[8, 9] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + W_1[6, 1]\}$
- » $\{0.03125, \text{Knot}[8, 10] \rightarrow W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + 3 W_1[6, 1]\}$
- » $\{0.015625, \text{Knot}[8, 11] \rightarrow W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + 3 W_1[6, 1]\}$
- » $\{0.03125, \text{Knot}[8, 12] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + W_1[6, 1]\}$
- » $\{0.03125, \text{Knot}[8, 13] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + W_1[6, 1]\}$
- » $\{0.03125, \text{Knot}[8, 14] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + W_1[6, 1]\}$
- » $\{0.03125, \text{Knot}[8, 15] \rightarrow W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 4] + W_1[5, 5] + 3 W_1[6, 1]\}$
- » $\{0.0625, \text{Knot}[8, 16] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 4] + W_1[5, 5] + W_1[6, 1]\}$
- » $\{0.109375, \text{Knot}[8, 17] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + W_1[6, 1]\}$
- » $\{0.09375, \text{Knot}[8, 18] \rightarrow W_1[1, 1] + 9 W_1[2, 1] + 9 W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + 9 W_1[6, 1]\}$
- » $\{0.046875, \text{Knot}[8, 19] \rightarrow W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + 3 W_1[6, 1]\}$
- » $\{0.0625, \text{Knot}[8, 20] \rightarrow W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 4] + W_1[5, 5] + 3 W_1[6, 1]\}$
- » $\{0.03125, \text{Knot}[8, 21] \rightarrow W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + 3 W_1[6, 1]\}$
- » $\{0.03125, \text{Knot}[9, 1] \rightarrow W_1[1, 1] + 3 W_1[2, 2] + 3 W_1[3, 3] + W_1[4, 1] + W_1[5, 1] + 3 W_1[6, 6]\}$
- » $\{0.046875, \text{Knot}[9, 2] \rightarrow W_1[1, 1] + 3 W_1[2, 2] + 3 W_1[3, 3] + W_1[4, 1] + W_1[5, 1] + 3 W_1[6, 6]\}$
- » $\{0.015625, \text{Knot}[9, 3] \rightarrow W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 1] + W_1[5, 1] + W_1[6, 6]\}$
- » $\{0.015625, \text{Knot}[9, 4] \rightarrow W_1[1, 1] + 3 W_1[2, 2] + 3 W_1[3, 3] + W_1[4, 1] + W_1[5, 1] + 3 W_1[6, 6]\}$
- » $\{0.03125, \text{Knot}[9, 5] \rightarrow W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 1] + W_1[5, 1] + W_1[6, 6]\}$
- » $\{0.03125, \text{Knot}[9, 6] \rightarrow W_1[1, 1] + 3 W_1[2, 2] + 3 W_1[3, 3] + W_1[4, 1] + W_1[5, 1] + 3 W_1[6, 6]\}$
- » $\{0.03125, \text{Knot}[9, 7] \rightarrow W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 1] + W_1[5, 1] + W_1[6, 6]\}$
- » $\{0.046875, \text{Knot}[9, 8] \rightarrow W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 5] + W_1[5, 4] + W_1[6, 6]\}$
- » $\{0.03125, \text{Knot}[9, 9] \rightarrow W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 1] + W_1[5, 1] + W_1[6, 6]\}$
- » $\{0.015625, \text{Knot}[9, 10] \rightarrow W_1[1, 1] + 3 W_1[2, 2] + 3 W_1[3, 3] + W_1[4, 1] + W_1[5, 1] + 3 W_1[6, 6]\}$
- » $\{0.0625, \text{Knot}[9, 11] \rightarrow W_1[1, 1] + 3 W_1[2, 2] + 3 W_1[3, 3] + W_1[4, 5] + W_1[5, 4] + 3 W_1[6, 6]\}$
- » $\{0.046875, \text{Knot}[9, 12] \rightarrow W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 4] + W_1[5, 5] + W_1[6, 6]\}$
- » $\{0.03125, \text{Knot}[9, 13] \rightarrow W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 1] + W_1[5, 1] + W_1[6, 6]\}$
- » $\{0.03125, \text{Knot}[9, 14] \rightarrow W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 1] + W_1[5, 1] + W_1[6, 6]\}$

- » $\{0.03125, \text{Knot}[9, 15] \rightarrow W_1[1, 1] + 3 W_1[2, 2] + 3 W_1[3, 3] + W_1[4, 5] + W_1[5, 4] + 3 W_1[6, 6]\}$
- » $\{0.046875, \text{Knot}[9, 16] \rightarrow W_1[1, 1] + 3 W_1[2, 2] + 3 W_1[3, 3] + W_1[4, 1] + W_1[5, 1] + 3 W_1[6, 6]\}$
- » $\{0.03125, \text{Knot}[9, 17] \rightarrow W_1[1, 1] + 3 W_1[2, 2] + 3 W_1[3, 3] + W_1[4, 5] + W_1[5, 4] + 3 W_1[6, 6]\}$
- » $\{0.046875, \text{Knot}[9, 18] \rightarrow W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 1] + W_1[5, 1] + W_1[6, 6]\}$
- » $\{0.109375, \text{Knot}[9, 19] \rightarrow W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 5] + W_1[5, 4] + W_1[6, 6]\}$
- » $\{0.078125, \text{Knot}[9, 20] \rightarrow W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 4] + W_1[5, 5] + W_1[6, 6]\}$
- » $\{0.03125, \text{Knot}[9, 21] \rightarrow W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 5] + W_1[5, 4] + W_1[6, 6]\}$
- » $\{0.0625, \text{Knot}[9, 22] \rightarrow W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 4] + W_1[5, 5] + W_1[6, 6]\}$
- » $\{0.03125, \text{Knot}[9, 23] \rightarrow W_1[1, 1] + 3 W_1[2, 2] + 3 W_1[3, 3] + W_1[4, 1] + W_1[5, 1] + 3 W_1[6, 6]\}$
- » $\{0.046875, \text{Knot}[9, 24] \rightarrow W_1[1, 1] + 3 W_1[2, 2] + 3 W_1[3, 3] + W_1[4, 5] + W_1[5, 4] + 3 W_1[6, 6]\}$
- » $\{0.03125, \text{Knot}[9, 25] \rightarrow W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 4] + W_1[5, 5] + W_1[6, 6]\}$
- » $\{0.03125, \text{Knot}[9, 26] \rightarrow W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 1] + W_1[5, 1] + W_1[6, 6]\}$
- » $\{0.0625, \text{Knot}[9, 27] \rightarrow W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 5] + W_1[5, 4] + W_1[6, 6]\}$
- » $\{0.03125, \text{Knot}[9, 28] \rightarrow W_1[1, 1] + 3 W_1[2, 2] + 3 W_1[3, 3] + W_1[4, 1] + W_1[5, 1] + 3 W_1[6, 6]\}$
- » $\{0.09375, \text{Knot}[9, 29] \rightarrow W_1[1, 1] + 3 W_1[2, 2] + 3 W_1[3, 3] + W_1[4, 5] + W_1[5, 4] + 3 W_1[6, 6]\}$
- » $\{0.0625, \text{Knot}[9, 30] \rightarrow W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 5] + W_1[5, 4] + W_1[6, 6]\}$
- » $\{0.046875, \text{Knot}[9, 31] \rightarrow W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 1] + W_1[5, 1] + W_1[6, 6]\}$
- » $\{0.0625, \text{Knot}[9, 32] \rightarrow W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 1] + W_1[5, 1] + W_1[6, 6]\}$
- » $\{0.078125, \text{Knot}[9, 33] \rightarrow W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 5] + W_1[5, 4] + W_1[6, 6]\}$
- » $\{0.046875, \text{Knot}[9, 34] \rightarrow W_1[1, 1] + 3 W_1[2, 2] + 3 W_1[3, 3] + W_1[4, 5] + W_1[5, 4] + 3 W_1[6, 6]\}$
- » $\{0.0625, \text{Knot}[9, 35] \rightarrow W_1[1, 1] + 9 W_1[2, 2] + 9 W_1[3, 3] + W_1[4, 1] + W_1[5, 1] + 9 W_1[6, 6]\}$
- » $\{0.03125, \text{Knot}[9, 36] \rightarrow W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 5] + W_1[5, 4] + W_1[6, 6]\}$
- » $\{0.03125, \text{Knot}[9, 37] \rightarrow W_1[1, 1] + 9 W_1[2, 2] + 9 W_1[3, 3] + W_1[4, 5] + W_1[5, 4] + 9 W_1[6, 6]\}$
- » $\{0.109375, \text{Knot}[9, 38] \rightarrow W_1[1, 1] + 3 W_1[2, 2] + 3 W_1[3, 3] + W_1[4, 1] + W_1[5, 1] + 3 W_1[6, 6]\}$
- » $\{0.109375, \text{Knot}[9, 39] \rightarrow W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 5] + W_1[5, 4] + W_1[6, 6]\}$
- » $\{0.09375, \text{Knot}[9, 40] \rightarrow W_1[1, 1] + 3 W_1[2, 2] + 3 W_1[3, 3] + W_1[4, 1] + W_1[5, 1] + 3 W_1[6, 6]\}$
- » $\{0.09375, \text{Knot}[9, 41] \rightarrow W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 1] + W_1[5, 1] + W_1[6, 6]\}$
- » $\{0.03125, \text{Knot}[9, 42] \rightarrow W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 4] + W_1[5, 5] + W_1[6, 6]\}$
- » $\{0.109375, \text{Knot}[9, 43] \rightarrow W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 5] + W_1[5, 4] + W_1[6, 6]\}$
- » $\{0.046875, \text{Knot}[9, 44] \rightarrow W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 5] + W_1[5, 4] + W_1[6, 6]\}$
- » $\{0.1875, \text{Knot}[9, 45] \rightarrow W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 4] + W_1[5, 5] + W_1[6, 6]\}$
- » $\{0.046875, \text{Knot}[9, 46] \rightarrow W_1[1, 1] + 9 W_1[2, 2] + 9 W_1[3, 3] + W_1[4, 1] + W_1[5, 1] + 9 W_1[6, 6]\}$
- » $\{0.078125, \text{Knot}[9, 47] \rightarrow W_1[1, 1] + 9 W_1[2, 2] + 9 W_1[3, 3] + W_1[4, 1] + W_1[5, 1] + 9 W_1[6, 6]\}$
- » $\{0.078125, \text{Knot}[9, 48] \rightarrow W_1[1, 1] + 9 W_1[2, 2] + 9 W_1[3, 3] + W_1[4, 5] + W_1[5, 4] + 9 W_1[6, 6]\}$
- » $\{0.0625, \text{Knot}[9, 49] \rightarrow W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 1] + W_1[5, 1] + W_1[6, 6]\}$
- » $\{0.046875, \text{Knot}[10, 1] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + W_1[6, 1]\}$

- » {0.0625, Knot [10, 2] → $W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + W_1[6, 1]$ }
- » {0.03125, Knot [10, 3] → $W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 4] + W_1[5, 5] + W_1[6, 1]$ }
- » {0.046875, Knot [10, 4] → $W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + 3 W_1[6, 1]$ }
- » {0.015625, Knot [10, 5] → $W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 4] + W_1[5, 5] + 3 W_1[6, 1]$ }
- » {0.03125, Knot [10, 6] → $W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + W_1[6, 1]$ }
- » {0.046875, Knot [10, 7] → $W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + W_1[6, 1]$ }
- » {0.046875, Knot [10, 8] → $W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 4] + W_1[5, 5] + W_1[6, 1]$ }
- » {0.140625, Knot [10, 9] → $W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + 3 W_1[6, 1]$ }
- » {0.046875, Knot [10, 10] → $W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 4] + W_1[5, 5] + 3 W_1[6, 1]$ }
- » {0.046875, Knot [10, 11] → $W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 4] + W_1[5, 5] + W_1[6, 1]$ }
- » {0.03125, Knot [10, 12] → $W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 4] + W_1[5, 5] + W_1[6, 1]$ }
- » {0.015625, Knot [10, 13] → $W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 4] + W_1[5, 5] + W_1[6, 1]$ }
- » {0.046875, Knot [10, 14] → $W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + 3 W_1[6, 1]$ }
- » {0.046875, Knot [10, 15] → $W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + W_1[6, 1]$ }
- » {0.03125, Knot [10, 16] → $W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + W_1[6, 1]$ }
- » {0.046875, Knot [10, 17] → $W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + W_1[6, 1]$ }
- » {0.046875, Knot [10, 18] → $W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 4] + W_1[5, 5] + W_1[6, 1]$ }
- » {0.03125, Knot [10, 19] → $W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + 3 W_1[6, 1]$ }
- » {0.03125, Knot [10, 20] → $W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + W_1[6, 1]$ }
- » {0.03125, Knot [10, 21] → $W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + 3 W_1[6, 1]$ }
- » {0.03125, Knot [10, 22] → $W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + W_1[6, 1]$ }
- » {0.03125, Knot [10, 23] → $W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 4] + W_1[5, 5] + W_1[6, 1]$ }
- » {0.046875, Knot [10, 24] → $W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + W_1[6, 1]$ }
- » {0.046875, Knot [10, 25] → $W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + W_1[6, 1]$ }
- » {0.046875, Knot [10, 26] → $W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + W_1[6, 1]$ }
- » {0.0625, Knot [10, 27] → $W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + W_1[6, 1]$ }
- » {0.03125, Knot [10, 28] → $W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 4] + W_1[5, 5] + W_1[6, 1]$ }
- » {0.046875, Knot [10, 29] → $W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 4] + W_1[5, 5] + 3 W_1[6, 1]$ }
- » {0.046875, Knot [10, 30] → $W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + W_1[6, 1]$ }
- » {0.03125, Knot [10, 31] → $W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + 3 W_1[6, 1]$ }
- » {0.0625, Knot [10, 32] → $W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 4] + W_1[5, 5] + 3 W_1[6, 1]$ }
- » {0.046875, Knot [10, 33] → $W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + W_1[6, 1]$ }
- » {0.0625, Knot [10, 34] → $W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 4] + W_1[5, 5] + W_1[6, 1]$ }
- » {0.046875, Knot [10, 35] → $W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + W_1[6, 1]$ }
- » {0.109375, Knot [10, 36] → $W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + 3 W_1[6, 1]$ }
- » {0.03125, Knot [10, 37] → $W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + W_1[6, 1]$ }

- » $\{0.03125, \text{Knot}[10, 38] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + W_1[6, 1]\}$
- » $\{0.03125, \text{Knot}[10, 39] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + W_1[6, 1]\}$
- » $\{0.09375, \text{Knot}[10, 40] \rightarrow W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 4] + W_1[5, 5] + 3 W_1[6, 1]\}$
- » $\{0.046875, \text{Knot}[10, 41] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 4] + W_1[5, 5] + W_1[6, 1]\}$
- » $\{0.046875, \text{Knot}[10, 42] \rightarrow W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + 3 W_1[6, 1]\}$
- » $\{0.03125, \text{Knot}[10, 43] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + W_1[6, 1]\}$
- » $\{0.078125, \text{Knot}[10, 44] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 4] + W_1[5, 5] + W_1[6, 1]\}$
- » $\{0.109375, \text{Knot}[10, 45] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + W_1[6, 1]\}$
- » $\{0.03125, \text{Knot}[10, 46] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + W_1[6, 1]\}$
- » $\{0.078125, \text{Knot}[10, 47] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 4] + W_1[5, 5] + W_1[6, 1]\}$
- » $\{0.046875, \text{Knot}[10, 48] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + W_1[6, 1]\}$
- » $\{0.046875, \text{Knot}[10, 49] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + W_1[6, 1]\}$
- » $\{0.03125, \text{Knot}[10, 50] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + W_1[6, 1]\}$
- » $\{0.046875, \text{Knot}[10, 51] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 4] + W_1[5, 5] + W_1[6, 1]\}$
- » $\{0.078125, \text{Knot}[10, 52] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + W_1[6, 1]\}$
- » $\{0.09375, \text{Knot}[10, 53] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + W_1[6, 1]\}$
- » $\{0.046875, \text{Knot}[10, 54] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + W_1[6, 1]\}$
- » $\{0.109375, \text{Knot}[10, 55] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + W_1[6, 1]\}$
- » $\{0.03125, \text{Knot}[10, 56] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + W_1[6, 1]\}$
- » $\{0.046875, \text{Knot}[10, 57] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 4] + W_1[5, 5] + W_1[6, 1]\}$
- » $\{0.078125, \text{Knot}[10, 58] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 4] + W_1[5, 5] + W_1[6, 1]\}$
- » $\{0.109375, \text{Knot}[10, 59] \rightarrow W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + 3 W_1[6, 1]\}$
- » $\{0.046875, \text{Knot}[10, 60] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 4] + W_1[5, 5] + W_1[6, 1]\}$
- » $\{0.046875, \text{Knot}[10, 61] \rightarrow W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + 3 W_1[6, 1]\}$
- » $\{0.078125, \text{Knot}[10, 62] \rightarrow W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 4] + W_1[5, 5] + 3 W_1[6, 1]\}$
- » $\{0.046875, \text{Knot}[10, 63] \rightarrow W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + 3 W_1[6, 1]\}$
- » $\{0.046875, \text{Knot}[10, 64] \rightarrow W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + 3 W_1[6, 1]\}$
- » $\{0.046875, \text{Knot}[10, 65] \rightarrow W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 4] + W_1[5, 5] + 3 W_1[6, 1]\}$
- » $\{0.109375, \text{Knot}[10, 66] \rightarrow W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + 3 W_1[6, 1]\}$
- » $\{0.03125, \text{Knot}[10, 67] \rightarrow W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + 3 W_1[6, 1]\}$
- » $\{0.09375, \text{Knot}[10, 68] \rightarrow W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + 3 W_1[6, 1]\}$
- » $\{0.0625, \text{Knot}[10, 69] \rightarrow W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 4] + W_1[5, 5] + 3 W_1[6, 1]\}$
- » $\{0.015625, \text{Knot}[10, 70] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + W_1[6, 1]\}$
- » $\{0.0625, \text{Knot}[10, 71] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + W_1[6, 1]\}$
- » $\{0.046875, \text{Knot}[10, 72] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + W_1[6, 1]\}$
- » $\{0.046875, \text{Knot}[10, 73] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + W_1[6, 1]\}$

- » $\{0.0625, \text{Knot}[10, 74] \rightarrow W_1[1, 1] + 9 W_1[2, 1] + 9 W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + 9 W_1[6, 1]\}$
- » $\{0.046875, \text{Knot}[10, 75] \rightarrow W_1[1, 1] + 9 W_1[2, 1] + 9 W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + 9 W_1[6, 1]\}$
- » $\{0.078125, \text{Knot}[10, 76] \rightarrow W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + 3 W_1[6, 1]\}$
- » $\{0.046875, \text{Knot}[10, 77] \rightarrow W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 4] + W_1[5, 5] + 3 W_1[6, 1]\}$
- » $\{0.078125, \text{Knot}[10, 78] \rightarrow W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + 3 W_1[6, 1]\}$
- » $\{0.046875, \text{Knot}[10, 79] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + W_1[6, 1]\}$
- » $\{0.09375, \text{Knot}[10, 80] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + W_1[6, 1]\}$
- » $\{0.0625, \text{Knot}[10, 81] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + W_1[6, 1]\}$
- » $\{0.078125, \text{Knot}[10, 82] \rightarrow W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 4] + W_1[5, 5] + 3 W_1[6, 1]\}$
- » $\{0.140625, \text{Knot}[10, 83] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 4] + W_1[5, 5] + W_1[6, 1]\}$
- » $\{0.0625, \text{Knot}[10, 84] \rightarrow W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 4] + W_1[5, 5] + 3 W_1[6, 1]\}$
- » $\{0.046875, \text{Knot}[10, 85] \rightarrow W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + 3 W_1[6, 1]\}$
- » $\{0.0625, \text{Knot}[10, 86] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + W_1[6, 1]\}$
- » $\{0.0625, \text{Knot}[10, 87] \rightarrow W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + 3 W_1[6, 1]\}$
- » $\{0.046875, \text{Knot}[10, 88] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + W_1[6, 1]\}$
- » $\{0.0625, \text{Knot}[10, 89] \rightarrow W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + 3 W_1[6, 1]\}$
- » $\{0.09375, \text{Knot}[10, 90] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + W_1[6, 1]\}$
- » $\{0.0625, \text{Knot}[10, 91] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + W_1[6, 1]\}$
- » $\{0.046875, \text{Knot}[10, 92] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + W_1[6, 1]\}$
- » $\{0.078125, \text{Knot}[10, 93] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + W_1[6, 1]\}$
- » $\{0.140625, \text{Knot}[10, 94] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + W_1[6, 1]\}$
- » $\{0.078125, \text{Knot}[10, 95] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 4] + W_1[5, 5] + W_1[6, 1]\}$
- » $\{0.0625, \text{Knot}[10, 96] \rightarrow W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + 3 W_1[6, 1]\}$
- » $\{0.15625, \text{Knot}[10, 97] \rightarrow W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + 3 W_1[6, 1]\}$
- » $\{0.1875, \text{Knot}[10, 98] \rightarrow W_1[1, 1] + 9 W_1[2, 1] + 9 W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + 9 W_1[6, 1]\}$
- » $\{0.0625, \text{Knot}[10, 99] \rightarrow W_1[1, 1] + 9 W_1[2, 1] + 9 W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + 9 W_1[6, 1]\}$
- » $\{0.046875, \text{Knot}[10, 100] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + W_1[6, 1]\}$
- » $\{0.078125, \text{Knot}[10, 101] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 4] + W_1[5, 5] + W_1[6, 1]\}$
- » $\{0.078125, \text{Knot}[10, 102] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + W_1[6, 1]\}$
- » $\{0.09375, \text{Knot}[10, 103] \rightarrow W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + 3 W_1[6, 1]\}$
- » $\{0.046875, \text{Knot}[10, 104] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + W_1[6, 1]\}$
- » $\{0.109375, \text{Knot}[10, 105] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + W_1[6, 1]\}$
- » $\{0.09375, \text{Knot}[10, 106] \rightarrow W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + 3 W_1[6, 1]\}$
- » $\{0.046875, \text{Knot}[10, 107] \rightarrow W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + 3 W_1[6, 1]\}$
- » $\{0.09375, \text{Knot}[10, 108] \rightarrow W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + 3 W_1[6, 1]\}$
- » $\{0.09375, \text{Knot}[10, 109] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + W_1[6, 1]\}$

- » $\{0.125, \text{Knot}[10, 110] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 4] + W_1[5, 5] + W_1[6, 1]\}$
- » $\{0.046875, \text{Knot}[10, 111] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + W_1[6, 1]\}$
- » $\{0.125, \text{Knot}[10, 112] \rightarrow W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 4] + W_1[5, 5] + 3 W_1[6, 1]\}$
- » $\{0.0625, \text{Knot}[10, 113] \rightarrow W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 4] + W_1[5, 5] + 3 W_1[6, 1]\}$
- » $\{0.0625, \text{Knot}[10, 114] \rightarrow W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 4] + W_1[5, 5] + 3 W_1[6, 1]\}$
- » $\{0.078125, \text{Knot}[10, 115] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + W_1[6, 1]\}$
- » $\{0.15625, \text{Knot}[10, 116] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 4] + W_1[5, 5] + W_1[6, 1]\}$
- » $\{0.078125, \text{Knot}[10, 117] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 4] + W_1[5, 5] + W_1[6, 1]\}$
- » $\{0.078125, \text{Knot}[10, 118] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + W_1[6, 1]\}$
- » $\{0.0625, \text{Knot}[10, 119] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + W_1[6, 1]\}$
- » $\{0.0625, \text{Knot}[10, 120] \rightarrow W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + 3 W_1[6, 1]\}$
- » $\{0.15625, \text{Knot}[10, 121] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + W_1[6, 1]\}$
- » $\{0.0625, \text{Knot}[10, 122] \rightarrow W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + 3 W_1[6, 1]\}$
- » $\{0.0625, \text{Knot}[10, 123] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + W_1[6, 1]\}$
- » $\{0.046875, \text{Knot}[10, 124] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 4] + W_1[5, 5] + W_1[6, 1]\}$
- » $\{0.109375, \text{Knot}[10, 125] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + W_1[6, 1]\}$
- » $\{0.046875, \text{Knot}[10, 126] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + W_1[6, 1]\}$
- » $\{0.046875, \text{Knot}[10, 127] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + W_1[6, 1]\}$
- » $\{0.046875, \text{Knot}[10, 128] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 4] + W_1[5, 5] + W_1[6, 1]\}$
- » $\{0.03125, \text{Knot}[10, 129] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + W_1[6, 1]\}$
- » $\{0.0625, \text{Knot}[10, 130] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + W_1[6, 1]\}$
- » $\{0.046875, \text{Knot}[10, 131] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + W_1[6, 1]\}$
- » $\{0.046875, \text{Knot}[10, 132] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + W_1[6, 1]\}$
- » $\{0.09375, \text{Knot}[10, 133] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + W_1[6, 1]\}$
- » $\{0.0625, \text{Knot}[10, 134] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 4] + W_1[5, 5] + W_1[6, 1]\}$
- » $\{0.046875, \text{Knot}[10, 135] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + W_1[6, 1]\}$
- » $\{0.046875, \text{Knot}[10, 136] \rightarrow W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + 3 W_1[6, 1]\}$
- » $\{0.046875, \text{Knot}[10, 137] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 4] + W_1[5, 5] + W_1[6, 1]\}$
- » $\{0.078125, \text{Knot}[10, 138] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + W_1[6, 1]\}$
- » $\{0.0625, \text{Knot}[10, 139] \rightarrow W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 4] + W_1[5, 5] + 3 W_1[6, 1]\}$
- » $\{0.03125, \text{Knot}[10, 140] \rightarrow W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + 3 W_1[6, 1]\}$
- » $\{0.0625, \text{Knot}[10, 141] \rightarrow W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 4] + W_1[5, 5] + 3 W_1[6, 1]\}$
- » $\{0.0625, \text{Knot}[10, 142] \rightarrow W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 4] + W_1[5, 5] + 3 W_1[6, 1]\}$
- » $\{0.03125, \text{Knot}[10, 143] \rightarrow W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + 3 W_1[6, 1]\}$
- » $\{0.1875, \text{Knot}[10, 144] \rightarrow W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 4] + W_1[5, 5] + 3 W_1[6, 1]\}$
- » $\{0.078125, \text{Knot}[10, 145] \rightarrow W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 4] + W_1[5, 5] + 3 W_1[6, 1]\}$

- » {0.046875, Knot [10, 146] → $W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + 3 W_1[6, 1]$ }
- » {0.0625, Knot [10, 147] → $W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + 3 W_1[6, 1]$ }
- » {0.046875, Knot [10, 148] → $W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + W_1[6, 1]$ }
- » {0.0625, Knot [10, 149] → $W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + W_1[6, 1]$ }
- » {0.09375, Knot [10, 150] → $W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + W_1[6, 1]$ }
- » {0.0625, Knot [10, 151] → $W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 4] + W_1[5, 5] + W_1[6, 1]$ }
- » {0.09375, Knot [10, 152] → $W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + W_1[6, 1]$ }
- » {0.0625, Knot [10, 153] → $W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + W_1[6, 1]$ }
- » {0.046875, Knot [10, 154] → $W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 4] + W_1[5, 5] + W_1[6, 1]$ }
- » {0.078125, Knot [10, 155] → $W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + W_1[6, 1]$ }
- » {0.125, Knot [10, 156] → $W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + W_1[6, 1]$ }
- » {0.046875, Knot [10, 157] → $W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + W_1[6, 1]$ }
- » {0.140625, Knot [10, 158] → $W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + 3 W_1[6, 1]$ }
- » {0.09375, Knot [10, 159] → $W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + 3 W_1[6, 1]$ }
- » {0.046875, Knot [10, 160] → $W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + 3 W_1[6, 1]$ }
- » {0.0625, Knot [10, 161] → $W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 5] + W_1[5, 4] + W_1[6, 1]$ }
- » {0.078125, Knot [10, 162] → $W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 4] + W_1[5, 5] + W_1[6, 1]$ }
- » {0.0625, Knot [10, 163] → $W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 4] + W_1[5, 5] + 3 W_1[6, 1]$ }
- » {0.125, Knot [10, 164] → $W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + 3 W_1[6, 1]$ }
- » {0.109375, Knot [10, 165] → $W_1[1, 1] + 3 W_1[2, 1] + 3 W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + 3 W_1[6, 1]$ }

In[*]:= **Max[First /@ tab]**

Out[*]= 0.1875

In[*]:= **DeclareGroup[\$G = S4, S4];**

tab = Table[Echo@Timing[K → ZEF[K]], {K, AllKnots[{3, 7}]}];

- » {0.140625, Knot [3, 1] → $W_1[1, 1] + 5 W_1[2, 2] + 5 W_1[3, 3] + 4 W_1[4, 1] + 4 W_1[5, 1] + 5 W_1[6, 6] + 5 W_1[7, 7] + W_1[8, 8] + 4 W_1[9, 1] + W_1[10, 10] + 4 W_1[10, 19] + W_1[11, 11] + 4 W_1[11, 14] + 4 W_1[12, 1] + 4 W_1[13, 1] + 4 W_1[14, 11] + W_1[14, 14] + 5 W_1[15, 15] + 4 W_1[16, 1] + W_1[17, 17] + W_1[18, 18] + 4 W_1[18, 23] + 4 W_1[19, 10] + W_1[19, 19] + 4 W_1[20, 1] + 4 W_1[21, 1] + 5 W_1[22, 22] + 4 W_1[23, 18] + W_1[23, 23] + W_1[24, 24]$ }
- » {1.39063, Knot [4, 1] → $W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + 4 W_1[4, 1] + 4 W_1[5, 1] + W_1[6, 1] + W_1[7, 1] + W_1[8, 1] + 4 W_1[9, 1] + W_1[10, 1] + W_1[11, 1] + 4 W_1[12, 1] + 4 W_1[13, 1] + W_1[14, 1] + W_1[15, 1] + 4 W_1[16, 1] + W_1[17, 1] + W_1[18, 1] + W_1[19, 1] + 4 W_1[20, 1] + 4 W_1[21, 1] + W_1[22, 1] + W_1[23, 1] + W_1[24, 1]$ }
- » {0.3125, Knot [5, 1] → $W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 4] + W_1[5, 5] + W_1[6, 6] + W_1[7, 7] + W_1[8, 8] + W_1[9, 9] + W_1[10, 19] + W_1[11, 14] + W_1[12, 12] + W_1[13, 13] + W_1[14, 11] + W_1[15, 15] + W_1[16, 16] + W_1[17, 17] + W_1[18, 23] + W_1[19, 10] + W_1[20, 20] + W_1[21, 21] + W_1[22, 22] + W_1[23, 18] + W_1[24, 24]$ }

- » {0.34375,
 $\text{Knot}[5, 2] \rightarrow W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 4] + W_1[5, 5] + W_1[6, 6] + W_1[7, 7] + W_1[8, 8] +$
 $W_1[9, 9] + W_1[10, 19] + W_1[11, 14] + W_1[12, 12] + W_1[13, 13] + W_1[14, 11] + W_1[15, 15] + W_1[16, 16] +$
 $W_1[17, 17] + W_1[18, 23] + W_1[19, 10] + W_1[20, 20] + W_1[21, 21] + W_1[22, 22] + W_1[23, 18] + W_1[24, 24]}$
- » {1.60938,
 $\text{Knot}[6, 1] \rightarrow W_1[1, 1] + 5 W_1[2, 1] + 5 W_1[3, 1] + W_1[4, 4] + W_1[5, 5] + 5 W_1[6, 1] + 5 W_1[7, 1] + W_1[8, 1] +$
 $W_1[9, 9] + 4 W_1[10, 1] + W_1[10, 17] + 4 W_1[11, 1] + W_1[11, 24] + W_1[12, 12] + W_1[13, 13] + 4 W_1[14, 1] +$
 $W_1[14, 24] + 5 W_1[15, 1] + W_1[16, 16] + W_1[17, 1] + 4 W_1[18, 1] + W_1[18, 8] + 4 W_1[19, 1] +$
 $W_1[19, 17] + W_1[20, 20] + W_1[21, 21] + 5 W_1[22, 1] + 4 W_1[23, 1] + W_1[23, 8] + W_1[24, 1]}$
- » {0.390625,
 $\text{Knot}[6, 2] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 4] + W_1[5, 5] + W_1[6, 1] + W_1[7, 1] + W_1[8, 1] +$
 $W_1[9, 9] + W_1[10, 17] + W_1[11, 24] + W_1[12, 12] + W_1[13, 13] + W_1[14, 24] + W_1[15, 1] + W_1[16, 16] +$
 $W_1[17, 1] + W_1[18, 8] + W_1[19, 17] + W_1[20, 20] + W_1[21, 21] + W_1[22, 1] + W_1[23, 8] + W_1[24, 1]}$
- » {2.45313,
 $\text{Knot}[6, 3] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + W_1[4, 1] + W_1[5, 1] + W_1[6, 1] + W_1[7, 1] + W_1[8, 1] +$
 $W_1[9, 1] + W_1[10, 1] + W_1[11, 1] + W_1[12, 1] + W_1[13, 1] + W_1[14, 1] + W_1[15, 1] + W_1[16, 1] + W_1[17, 1] +$
 $W_1[18, 1] + W_1[19, 1] + W_1[20, 1] + W_1[21, 1] + W_1[22, 1] + W_1[23, 1] + W_1[24, 1]}$
- » {0.734375,
 $\text{Knot}[7, 1] \rightarrow W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 5] + W_1[5, 4] + W_1[6, 6] + W_1[7, 7] + W_1[8, 8] +$
 $W_1[9, 13] + W_1[10, 10] + W_1[11, 11] + W_1[12, 20] + W_1[13, 9] + W_1[14, 14] + W_1[15, 15] + W_1[16, 21] +$
 $W_1[17, 17] + W_1[18, 18] + W_1[19, 19] + W_1[20, 12] + W_1[21, 16] + W_1[22, 22] + W_1[23, 23] + W_1[24, 24]}$
- » {2.1875, $\text{Knot}[7, 2] \rightarrow W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + 4 W_1[4, 5] + 4 W_1[5, 4] +$
 $W_1[6, 6] + W_1[7, 7] + W_1[8, 8] + 4 W_1[9, 13] + W_1[10, 10] + W_1[11, 11] + 4 W_1[12, 20] +$
 $4 W_1[13, 9] + W_1[14, 14] + W_1[15, 15] + 4 W_1[16, 21] + W_1[17, 17] + W_1[18, 18] +$
 $W_1[19, 19] + 4 W_1[20, 12] + 4 W_1[21, 16] + W_1[22, 22] + W_1[23, 23] + W_1[24, 24]}$
- » {1.42188, $\text{Knot}[7, 3] \rightarrow W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + 4 W_1[4, 4] + 4 W_1[5, 5] +$
 $W_1[6, 6] + W_1[7, 7] + W_1[8, 8] + 4 W_1[9, 9] + W_1[10, 19] + W_1[11, 14] + 4 W_1[12, 12] +$
 $4 W_1[13, 13] + W_1[14, 11] + W_1[15, 15] + 4 W_1[16, 16] + W_1[17, 17] + W_1[18, 23] +$
 $W_1[19, 10] + 4 W_1[20, 20] + 4 W_1[21, 21] + W_1[22, 22] + W_1[23, 18] + W_1[24, 24]}$
- » {3.64063,
 $\text{Knot}[7, 4] \rightarrow W_1[1, 1] + 5 W_1[2, 2] + 5 W_1[3, 3] + W_1[4, 4] + W_1[5, 5] + 5 W_1[6, 6] + 5 W_1[7, 7] + W_1[8, 8] +$
 $W_1[9, 9] + 4 W_1[10, 10] + W_1[10, 19] + 4 W_1[11, 11] + W_1[11, 14] + W_1[12, 12] + W_1[13, 13] + W_1[14, 11] +$
 $4 W_1[14, 14] + 5 W_1[15, 15] + W_1[16, 16] + W_1[17, 17] + 4 W_1[18, 18] + W_1[18, 23] + W_1[19, 10] +$
 $4 W_1[19, 19] + W_1[20, 20] + W_1[21, 21] + 5 W_1[22, 22] + W_1[23, 18] + 4 W_1[23, 23] + W_1[24, 24]}$
- » {3.78125,
 $\text{Knot}[7, 5] \rightarrow W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 5] + W_1[5, 4] + W_1[6, 6] + W_1[7, 7] + W_1[8, 8] +$
 $W_1[9, 13] + W_1[10, 10] + W_1[11, 11] + W_1[12, 20] + W_1[13, 9] + W_1[14, 14] + W_1[15, 15] + W_1[16, 21] +$
 $W_1[17, 17] + W_1[18, 18] + W_1[19, 19] + W_1[20, 12] + W_1[21, 16] + W_1[22, 22] + W_1[23, 23] + W_1[24, 24]}$
- » {2.64063,
 $\text{Knot}[7, 6] \rightarrow W_1[1, 1] + W_1[2, 2] + W_1[3, 3] + W_1[4, 1] + W_1[5, 1] + W_1[6, 6] + W_1[7, 7] + W_1[8, 8] +$
 $W_1[9, 1] + W_1[10, 10] + W_1[11, 11] + W_1[12, 1] + W_1[13, 1] + W_1[14, 14] + W_1[15, 15] + W_1[16, 1] +$
 $W_1[17, 17] + W_1[18, 18] + W_1[19, 19] + W_1[20, 1] + W_1[21, 1] + W_1[22, 22] + W_1[23, 23] + W_1[24, 24]}$
- » {3.42188, $\text{Knot}[7, 7] \rightarrow$
 $W_1[1, 1] + 5 W_1[2, 2] + 5 W_1[3, 3] + W_1[4, 4] + W_1[5, 5] + 5 W_1[6, 6] + 5 W_1[7, 7] + W_1[8, 8] + W_1[9, 9] +$
 $W_1[10, 10] + 4 W_1[10, 19] + W_1[11, 11] + 4 W_1[11, 14] + W_1[12, 12] + W_1[13, 13] + 4 W_1[14, 11] +$
 $W_1[14, 14] + 5 W_1[15, 15] + W_1[16, 16] + W_1[17, 17] + W_1[18, 18] + 4 W_1[18, 23] + 4 W_1[19, 10] +$
 $W_1[19, 19] + W_1[20, 20] + W_1[21, 21] + 5 W_1[22, 22] + 4 W_1[23, 18] + W_1[23, 23] + W_1[24, 24]}$

```
In[ ]:= DeclareGroup[$G = S5, S5];  
tab = Table[Echo@Timing[K → ZEF[K]], {K, AllKnots[{3, 7}]}];
```

» {32.4063, Knot[3, 1] →

$$\begin{aligned}
 & W_1[1, 1] + 7 W_1[2, 2] + 7 W_1[3, 3] + 7 W_1[4, 1] + 7 W_1[5, 1] + 7 W_1[6, 6] + 7 W_1[7, 7] + 5 W_1[8, 8] + \\
 & 7 W_1[9, 1] + W_1[10, 10] + 4 W_1[10, 19] + W_1[11, 11] + 4 W_1[11, 14] + 7 W_1[12, 1] + 7 W_1[13, 1] + \\
 & 4 W_1[14, 11] + W_1[14, 14] + 7 W_1[15, 15] + 7 W_1[16, 1] + 5 W_1[17, 17] + W_1[18, 18] + 4 W_1[18, 23] + \\
 & 4 W_1[19, 10] + W_1[19, 19] + 7 W_1[20, 1] + 7 W_1[21, 1] + 7 W_1[22, 22] + 4 W_1[23, 18] + W_1[23, 23] + \\
 & 5 W_1[24, 24] + 7 W_1[25, 25] + 5 W_1[26, 26] + 5 W_1[27, 27] + W_1[28, 25] + W_1[29, 25] + 5 W_1[30, 30] + \\
 & 7 W_1[31, 1] + W_1[32, 2] + W_1[33, 33] + 4 W_1[33, 73] + W_1[34, 65] + 5 W_1[34, 91] + W_1[35, 72] + \\
 & 5 W_1[35, 116] + W_1[36, 36] + 4 W_1[36, 98] + W_1[37, 37] + 4 W_1[37, 51] + W_1[38, 94] + 5 W_1[38, 113] + \\
 & 7 W_1[39, 1] + W_1[40, 40] + 4 W_1[40, 99] + W_1[41, 6] + 5 W_1[42, 69] + W_1[42, 86] + 5 W_1[43, 90] + \\
 & W_1[43, 117] + W_1[44, 44] + 4 W_1[44, 54] + W_1[45, 45] + 4 W_1[45, 76] + 7 W_1[46, 1] + 5 W_1[47, 64] + \\
 & W_1[47, 109] + W_1[48, 3] + 7 W_1[49, 1] + W_1[50, 2] + 4 W_1[51, 37] + W_1[51, 51] + W_1[52, 90] + \\
 & 5 W_1[52, 117] + 5 W_1[53, 94] + W_1[53, 113] + 4 W_1[54, 44] + W_1[54, 54] + 7 W_1[55, 55] + 5 W_1[56, 56] + \\
 & 7 W_1[57, 1] + W_1[58, 58] + 4 W_1[58, 103] + W_1[59, 59] + 4 W_1[59, 80] + 7 W_1[60, 1] + 5 W_1[61, 61] + \\
 & W_1[62, 55] + W_1[63, 63] + 4 W_1[63, 85] + W_1[64, 47] + 5 W_1[64, 78] + 5 W_1[65, 34] + W_1[65, 97] + \\
 & W_1[66, 15] + W_1[67, 55] + 5 W_1[68, 68] + W_1[69, 42] + 5 W_1[69, 101] + W_1[70, 70] + 4 W_1[70, 110] + \\
 & W_1[71, 22] + 5 W_1[72, 35] + W_1[72, 74] + 4 W_1[73, 33] + W_1[73, 73] + 5 W_1[74, 72] + W_1[74, 116] + \\
 & 7 W_1[75, 1] + 4 W_1[76, 45] + W_1[76, 76] + W_1[77, 6] + W_1[78, 64] + 5 W_1[78, 109] + 7 W_1[79, 1] + \\
 & 4 W_1[80, 59] + W_1[80, 80] + 7 W_1[81, 81] + 7 W_1[82, 1] + 5 W_1[83, 83] + W_1[84, 84] + 4 W_1[84, 107] + \\
 & 4 W_1[85, 63] + W_1[85, 85] + 5 W_1[86, 42] + W_1[86, 101] + 5 W_1[87, 87] + W_1[88, 7] + W_1[89, 81] + \\
 & W_1[90, 43] + 5 W_1[90, 52] + W_1[91, 34] + 5 W_1[91, 97] + W_1[92, 22] + W_1[93, 81] + 5 W_1[94, 38] + \\
 & W_1[94, 53] + 5 W_1[95, 95] + W_1[96, 96] + 4 W_1[96, 119] + 5 W_1[97, 65] + W_1[97, 91] + 4 W_1[98, 36] + \\
 & W_1[98, 98] + 4 W_1[99, 40] + W_1[99, 99] + 7 W_1[100, 1] + W_1[101, 69] + 5 W_1[101, 86] + W_1[102, 3] + \\
 & 4 W_1[103, 58] + W_1[103, 103] + 7 W_1[104, 1] + 7 W_1[105, 1] + 7 W_1[106, 106] + 4 W_1[107, 84] + \\
 & W_1[107, 107] + 5 W_1[108, 108] + 5 W_1[109, 47] + W_1[109, 78] + 4 W_1[110, 70] + W_1[110, 110] + W_1[111, 7] + \\
 & 5 W_1[112, 112] + W_1[113, 38] + 5 W_1[113, 53] + W_1[114, 106] + W_1[115, 15] + W_1[116, 35] + 5 W_1[116, 74] + \\
 & 5 W_1[117, 43] + W_1[117, 52] + W_1[118, 106] + 4 W_1[119, 96] + W_1[119, 119] + 5 W_1[120, 120] \}
 \end{aligned}$$

» {68.0313,

$$\begin{aligned}
 & \text{Knot}[4, 1] \rightarrow W_1[1, 1] + W_1[2, 1] + W_1[3, 1] + 7 W_1[4, 1] + 7 W_1[5, 1] + W_1[6, 1] + W_1[7, 1] + 9 W_1[8, 1] + \\
 & 7 W_1[9, 1] + W_1[10, 1] + W_1[11, 1] + 7 W_1[12, 1] + 7 W_1[13, 1] + W_1[14, 1] + W_1[15, 1] + 7 W_1[16, 1] + \\
 & 9 W_1[17, 1] + W_1[18, 1] + W_1[19, 1] + 7 W_1[20, 1] + 7 W_1[21, 1] + W_1[22, 1] + W_1[23, 1] + 9 W_1[24, 1] + \\
 & W_1[25, 1] + 9 W_1[26, 1] + 9 W_1[27, 1] + W_1[28, 1] + 6 W_1[28, 4] + 6 W_1[28, 5] + W_1[29, 1] + 6 W_1[29, 4] + \\
 & 6 W_1[29, 5] + 9 W_1[30, 1] + 7 W_1[31, 1] + W_1[32, 1] + 6 W_1[32, 31] + 6 W_1[32, 49] + W_1[33, 1] + W_1[34, 1] + \\
 & W_1[35, 1] + W_1[36, 1] + W_1[37, 1] + W_1[38, 1] + 7 W_1[39, 1] + W_1[40, 1] + W_1[41, 1] + 6 W_1[41, 39] + \\
 & 6 W_1[41, 75] + W_1[42, 1] + W_1[43, 1] + W_1[44, 1] + W_1[45, 1] + 7 W_1[46, 1] + W_1[47, 1] + W_1[48, 1] + \\
 & 6 W_1[48, 46] + 6 W_1[48, 100] + 7 W_1[49, 1] + W_1[50, 1] + 6 W_1[50, 31] + 6 W_1[50, 49] + W_1[51, 1] + \\
 & W_1[52, 1] + W_1[53, 1] + W_1[54, 1] + W_1[55, 1] + 9 W_1[56, 1] + 7 W_1[57, 1] + W_1[58, 1] + W_1[59, 1] + \\
 & 7 W_1[60, 1] + 9 W_1[61, 1] + W_1[62, 1] + 6 W_1[62, 16] + 6 W_1[62, 21] + W_1[63, 1] + W_1[64, 1] + W_1[65, 1] + \\
 & W_1[66, 1] + 6 W_1[66, 60] + 6 W_1[66, 104] + W_1[67, 1] + 6 W_1[67, 16] + 6 W_1[67, 21] + 9 W_1[68, 1] + \\
 & W_1[69, 1] + W_1[70, 1] + W_1[71, 1] + 6 W_1[71, 57] + 6 W_1[71, 79] + W_1[72, 1] + W_1[73, 1] + W_1[74, 1] + \\
 & 7 W_1[75, 1] + W_1[76, 1] + W_1[77, 1] + 6 W_1[77, 39] + 6 W_1[77, 75] + W_1[78, 1] + 7 W_1[79, 1] + W_1[80, 1] + \\
 & W_1[81, 1] + 7 W_1[82, 1] + 9 W_1[83, 1] + W_1[84, 1] + W_1[85, 1] + W_1[86, 1] + 9 W_1[87, 1] + W_1[88, 1] + \\
 & 6 W_1[88, 82] + 6 W_1[88, 105] + W_1[89, 1] + 6 W_1[89, 12] + 6 W_1[89, 20] + W_1[90, 1] + W_1[91, 1] + \\
 & W_1[92, 1] + 6 W_1[92, 57] + 6 W_1[92, 79] + W_1[93, 1] + 6 W_1[93, 12] + 6 W_1[93, 20] + W_1[94, 1] + \\
 & 9 W_1[95, 1] + W_1[96, 1] + W_1[97, 1] + W_1[98, 1] + W_1[99, 1] + 7 W_1[100, 1] + W_1[101, 1] + W_1[102, 1] + \\
 & 6 W_1[102, 46] + 6 W_1[102, 100] + W_1[103, 1] + 7 W_1[104, 1] + 7 W_1[105, 1] + W_1[106, 1] + W_1[107, 1] + \\
 & 9 W_1[108, 1] + W_1[109, 1] + W_1[110, 1] + W_1[111, 1] + 6 W_1[111, 82] + 6 W_1[111, 105] + 9 W_1[112, 1] + \\
 & W_1[113, 1] + W_1[114, 1] + 6 W_1[114, 9] + 6 W_1[114, 13] + W_1[115, 1] + 6 W_1[115, 60] + 6 W_1[115, 104] + \\
 & W_1[116, 1] + W_1[117, 1] + W_1[118, 1] + 6 W_1[118, 9] + 6 W_1[118, 13] + W_1[119, 1] + 9 W_1[120, 1] \}
 \end{aligned}$$

Out[]= \$Aborted

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To do: Implement and verify Δ etc.