

```
In[*]:= SetDirectory["C:\\Users\\T15Roland\\Wiskunde\\Bn\\HigherRank"];
Once[<< KnotTheory`];
<< Rot.m
(α-)+ := α+++;
(* this is for cosmetic reasons only *)
```

- ☺ ParentDirectory: Argument File should be a positive machine-size integer, a nonempty string, or a File specification.
- ☺ ParentDirectory: Argument File should be a positive machine-size integer, a nonempty string, or a File specification.
- ☺ ToFileName: String or list of strings expected at position 1 in ToFileName[{File, WikiLink, mathematica}]
- ☺ ToFileName: String or list of strings expected at position 1 in ToFileName[{File, QuantumGroups}]

Loading KnotTheory` version of September 6, 2014, 13:37:37.2841.

Read more at <http://katlas.org/wiki/KnotTheory>.

Loading Rot.m from <http://drorbn.net/AP/Projects/HigherRank> to compute rotation numbers.

```
In[*]:= r0[1, i_, j_] := p3,j x1,i x2,i - (p3,j x1,j x2,i / T1) (*from r0p*)
r0[-1, i_, j_] := - (p3,j x1,i x2,i / T1^2 T2) + (p3,j x1,j x2,i / T1 T2)
r1[1, i_, j_] := (T2 p1,j p2,j x1,i x2,i - p1,j p2,i x1,j x2,i) / (-1 + T1 T2) -
(p1,j p2,j x1,j x2,i / (-1 + T1) T1) + (p1,i p2,j x1,i x2,j / (-1 + T1) (-1 + T1 T2)) +
(p1,j p2,i x3,i - p1,j p2,j x3,i + p3,j x3,i / T1 (-1 + T1 T2) - p1,j p3,j x1,i x3,i +
(p1,j p3,i x1,j x3,i / (-1 + T1) T1 (-1 + T1 T2)) + (p1,j p3,j x1,j x3,i / (-1 + T1) T1 (-1 + T1 T2)) -
(T2 p2,j p3,j x2,i x3,i / T1) - (p2,j p3,i x2,j x3,i / T1 (-1 + T1 T2)) - (p1,i p3,j x1,i x3,j / (-1 + T1) (-1 + T1 T2)) +
(T2 p2,j p3,j x2,i x3,i / T1 (-1 + T1 T2))
r1[-1, i_, j_] := (p1,j p2,i x1,i x2,i / T1^2 (-1 + T1 T2)) - ((-1 + T2) p1,i p2,j x1,i x2,i / (-1 + T1) T2 (-1 + T1 T2)) +
((-T1 - T2 + T1 T2) p1,j p2,j x1,i x2,i / T1^2 T2 (-1 + T1 T2)) +
(p1,j p2,i x1,j x2,i / (-1 + T1) T1 (-1 + T1 T2)) + (p1,j p2,j x1,j x2,i / T1 (-1 + T1 T2)) -
(p1,i p2,j x1,i x2,j / (-1 + T1) (-1 + T1 T2)) + (p1,j p2,j x1,i x2,j / T1 (-1 + T1 T2)) -
(p1,j p2,i x3,i / T1) + (p1,j p2,j x3,i / T1) - (p3,j x3,i / T1 (-1 + T1 T2)) - (p1,j p3,i x1,i x3,i / T1^2 (-1 + T1 T2)) +
(p1,i p3,j x1,i x3,i / (-1 + T1) T1 T2) -
(p1,j p3,j x1,i x3,i / T1^2 T2) - (p1,j p3,i x1,j x3,i / (-1 + T1) T1 (-1 + T1 T2)) + ((-1 + T2) p2,j p3,i x2,i x3,i / T1 T2 (-1 + T1 T2)) +
(p2,i p3,j x2,i x3,i / T1^2 T2) - ((-1 + 2 T2) p2,j p3,j x2,i x3,i / T1^2 T2^2) + (p2,j p3,i x2,j x3,i / T1 (-1 + T1 T2)) -
(p2,j p3,j x2,j x3,i / T1^2 T2) + (p1,i p3,j x1,i x3,j / (-1 + T1) (-1 + T1 T2)) - (p1,j p3,j x1,i x3,j / T1 (-1 + T1 T2)) -
(p2,j p3,j x2,i x3,i / T1 (-1 + T1 T2))
```

```
In[*]:= g2px[ε_] := Module[{λ}, Expand[ε /. g_{α,i,j} => λ p_{α,i} x_{α,j} /. λ^{k-} => 1/k!]
```

```
In[*]:= {p*, x*, π*, ξ*} = {π, ξ, p, x}; (u_{i_})^* := (u^*)_i;
```

```
In[*]:= Zip[_][ε_] := ε;
Zip[{ε_, εs_}][ε_] := (Collect[ε // Zip[{εs}], ζ] /. f_ . ζ^{d-} => (D[f, {ζ*, d}])) /. ζ* -> 0
```

```
In[*]:= px2g[ε_] := Module[{ps, xs, Q},
  ps = Union[Cases[ε, p_, ∞]];
  xs = Union[Cases[ε, x_, ∞]];
  Q = Sum[p0* x0* g_{p0[[2]], x0[[2]], p0[[3]], x0[[3]], {p0, ps}, {x0, xs}];
  Expand[Zip_{ps|xs}[ε e^Q] /. g_{α,β,i,j} => If[α == β, g_{α,i,j}, 0]]
]
```

```
In[*]:= R1[1, i_, j_] := Evaluate[px2g[r1[1, i, j]] +
  (Coefficient[r1[1, i, j] /. t: (x | p) -> λ t, λ^3] /. x_{3,α} p_{1,β} p_{2,γ} => y_{α,β,γ})]
R1[-1, i_, j_] := Evaluate[px2g[r1[-1, i, j]] +
  (Coefficient[r1[-1, i, j] /. t: (x | p) -> λ t, λ^3] /. x_{3,α} p_{1,β} p_{2,γ} => y_{α,β,γ})]
Piv_{i_} := -\frac{1}{T_1 (-1 + T_1 T_2)} g_{3,i,i} (* -\frac{(-2+T_1+T_2) (-T_1-T_2+2 T_1 T_2) g_{3,i,i}}{(-1+T_1) (-1+T_2) (-1+T_1 T_2)} *)
```

```
In[*]:= θ[1, i_, j_, α_, β_, γ_] :=
  Evaluate[r_0[1, i, j] /. {p_{3,j} => g_{3,j,α}, x_{1,i} => g_{1,β,i}, x_{2,i} => g_{2,γ,i}}];
(* The θ graph with light (pxx) vertex at (1,i,j) and
  unspecified heavy (xpp) vertex *)
θ[-1, i_, j_, α_, β_, γ_] :=
  Evaluate[r_0[-1, i, j] /. {p_{3,j} => g_{3,j,α}, x_{1,i} => g_{1,β,i}, x_{2,i} => g_{2,γ,i}}];
(* The θ graph with light (pxx) vertex at (-1,i,j)
  and unspecified heavy (xpp) vertex *)
θ[1, 5, 8, 21, 22, 23]
```

```
Out[*]= g_{1,22,5} g_{2,23,5} g_{3,8,21} - \frac{g_{1,22,8} g_{2,23,5} g_{3,8,21}}{T_1}
```

```

In[*]:= T3 = T1 T2;
CF[ε_] := Factor@Together[ε];
λ[K_] := Module[{Cs, φ, n, A, s, i, j, k, Δ, G, gEval, Y, yEval, c, λ1},
  {Cs, φ} = Rot[K]; n = Length[Cs];
  A = IdentityMatrix[2 n + 1];
  Cases[Cs, {s_, i_, j_} >=> (A[[{i, j}, {i + 1, j + 1}]] += (

$$\begin{pmatrix} -T^s & T^s & -1 \\ \mathbf{0} & & -1 \end{pmatrix}$$

))] >];
  Δ = T(-Total[φ]-Total[Cs[[All,1]])/2 Det[A];
  G = Inverse[A];
  gEval[ε_] := CF[ε /.
    {g1,α,β >=> (G[[α, β]] /. T → T1),
     g2,α,β >=> (G[[α, β]] /. T → T2), g3,α,β >=> (G[[α, β]] /. T → T3)}];
  Y[α_, β_, γ_] :=
  Y[α, β, γ] = Sum[{s, i, j} = c; (* The expectation value of x3,αp1,βp2,γ*)
    θ[s, i, j, α, β, γ],
    {c, Cs}];
  yEval[ε_] := ε /. yα,β,γ >=> Y[α, β, γ];
  λ1 = ∑k=1n R1 @@ Cs[[k]] + ∑k=12n φ[[k]] Pivk;
  {Δ, (1 - T3) (Δ /. T → T1) (Δ /. T → T2) (Δ /. T → T3) λ1} // yEval // gEval // Expand
];
θ[K_] := Module[{L = λ[K]},
  {L[[1]], T1 L[[2]] + (T D[L[[1]], T] /. T → T3) (L[[1]] /. T → T1) (L[[1]] /. T → T2)} // Expand]

```

```

In[*]:= CF[ε_] := Factor@Together[ε];
Nλp1,p2[K_] := Module[{G1, G2, G3, Δ1, Δ2, Δ3,
  A1, A2, A3, Cs, φ, n, A, s, i, j, k, Δ, G, gEval, Y, yEval, c, λ1},
  {Cs, φ} = Rot[K]; n = Length[Cs];
  A = IdentityMatrix[2 n + 1];
  Cases[Cs, {s_, i_, j_} => (A[[{i, j}, {i + 1, j + 1}]] += (

$$\begin{pmatrix} -T^s & T^s - 1 \\ \mathbf{0} & -1 \end{pmatrix}$$

))];
  A1 = A /. T -> p1; A2 = A /. T -> p2; A3 = A /. T -> p1 p2;
  Δ1 = p1(-Total[φ]-Total[Cs[[A1,1]])/2 Det[A1];
  Δ2 = p2(-Total[φ]-Total[Cs[[A2,1]])/2 Det[A2];
  Δ3 = (p1 p2)(-Total[φ]-Total[Cs[[A3,1]])/2 Det[A3];
  G1 = Inverse[A1]; G2 = Inverse[A2]; G3 = Inverse[A3];
  gEval[ε_] := CF[ε /.
    {g1,α,β => G1[[α, β]], g2,α,β => G2[[α, β]], g3,α,β => G3[[α, β]]}];
  Y[α_, β_, γ_] :=
  Y[α, β, γ] = Sum[{s, i, j} = c; (* The expectation value of x3,αp1,βp2,γ*)
    Θ[s, i, j, α, β, γ],
    {c, Cs}] /. {T1 -> p1, T2 -> p2};
  yEval[ε_] := ε /. yα,β,γ => Y[α, β, γ];
  λ1 = ∑k=1n R1@@Cs[[k]] + ∑k=12n φ[[k]] Pivk /. {T1 -> p1, T2 -> p2};
  {Δ1, (1 - p1 p2) Δ1 Δ2 Δ3 λ1} // yEval // gEval // Expand
];

```

```

In[*]:= Rrho1[s_, i_, j_] := s (gji (gj+1,j + gj,j+1 - gij) - gii (gj,j+1 - 1) - 1 / 2);
ρ[K_] := ρ[K] = Module[{Cs, φ, n, A, s, i, j, k, Δ, G, ρ1},
  {Cs, φ} = Rot[K]; n = Length[Cs];
  A = IdentityMatrix[2 n + 1];
  Cases[Cs, {s_, i_, j_} => (A[[{i, j}, {i + 1, j + 1}]] += (

$$\begin{pmatrix} -T^s & T^s - 1 \\ \mathbf{0} & -1 \end{pmatrix}$$

))];
  Δ = T(-Total[φ]-Total[Cs[[A,1]])/2 Det[A];
  G = Inverse[A];
  ρ1 = ∑k=1n Rrho1@@Cs[[k]] - ∑k=12n φ[[k]] (gkk - 1 / 2);
  Expand@Together@{Δ, Δ2 ρ1 /. gα,β => G[[α, β]]}
];

```

```

In[*]:= ColFun[t_] := If[t > 0, {t, 0, 0}, {0, 0, t}]
Renorm[t_] := If[t == 0, 0, Sign[t] Log[Abs[t] + 10]]
Poly2Pic[P_] := Module[{e1 = Exponent[P, T1^-1], e2 = Exponent[P, T2^-1], Mat},
  If[P === 0, P, Mat =
    Map[Renorm, Normal@SparseArray[CoefficientRules[T1^e1+1 T2^e2+1 P, {T1, T2}]], {2}];
  MatrixPlot[Mat (*, ColorFunction -> (RGBColor[If[## == 0, 0, 1], 0, 0] &) *]]
]

```

## Relation to $\rho_1$ :

```

In[*]:= CheckRelationTorho1[K_] := Module[{th =  $\theta$ [K][[2]], rh =  $\rho$ [K][[2]],
  ({th /. {T1 -> 1}, th /. {T2 -> 1}} + rh) /. T_ -> T // Together]

```

```

In[*]:= CheckRelationTorho1 /@ AllKnots[{3, 8}]

```

```

Out[*]=

```

```

{{0, 0}, {0, 0}, {0, 0}, {0, 0}, {0, 0}, {0, 0}, {0, 0}, {0, 0}, {0, 0}, {0, 0}, {0, 0}, {0, 0},
{0, 0}, {0, 0}, {0, 0}, {0, 0}, {0, 0}, {0, 0}, {0, 0}, {0, 0}, {0, 0}, {0, 0}, {0, 0}, {0, 0},
{0, 0}, {0, 0}, {0, 0}, {0, 0}, {0, 0}, {0, 0}, {0, 0}, {0, 0}, {0, 0}, {0, 0}, {0, 0}, {0, 0}}

```

## Symmetries

```

In[*]:= CheckT12swapsym[K_] := Module[{th =  $\theta$ [K][[2]], {th - (th /. {T1 -> T2, T2 -> T1})}}]

```

```

In[*]:= CheckT12swapsym /@ AllKnots[{3, 8}] // Union

```

```

Out[*]=

```

```

{{0}}

```

```

In[*]:= CheckT12swapsym[Knot[11, NonAlternating, 34]]

```

```

Out[*]=

```

```

{0}

```

```

In[*]:= CheckMirr[K_] := Module[{th =  $\theta$ [K][[2]], thm =  $\theta$ [Mirror@K][[2]], {th + thm}]
CheckMirr /@ AllKnots[{3, 7}] // Union

```

```

Out[*]=

```

```

{{0}}

```

```

In[*]:= CheckMirr[Knot[11, NonAlternating, 34]]

```

```

Out[*]=

```

```

{0}

```

```

In[*]:= CheckT1T2palin[K_] := Module[{th =  $\theta$ [K][[2]], {th - (th /. {T1 -> T1^-1, T2 -> T2^-1})}}]

```

```

In[*]:= CheckT1T2palin /@ AllKnots[{3, 8}] // Union

```

```

Out[*]=

```

```

{{0}}

```

```

In[*]:= CheckT1T2palin[Knot[11, NonAlternating, 34]]
Out[*]=
{0}

In[*]:= CheckT1T2mystsym[K_] := Module[{th = 0[K][[2]], {th - (th /. {T1 -> T1, T2 -> T3^-1})}}]
CheckT1T2mystsym /@ AllKnots[{3, 8}]
Out[*]=
{{0}, {0}, {0}, {0}, {0}, {0}, {0}, {0}, {0}, {0}, {0}, {0}, {0}, {0}, {0}, {0}, {0}, {0}, {0},
{0}, {0}, {0}, {0}, {0}, {0}, {0}, {0}, {0}, {0}, {0}, {0}, {0}, {0}}

In[*]:= CheckT1T2mystsym[Knot[11, NonAlternating, 34]]
Out[*]=
{0}

```

Moving to better variables, very similar to Garoufalidis-Kashaev:

$$u = T_1 + T_1^{-1} + T_2 + T_2^{-1} + T_3 + T_3^{-1} - 2$$

$$v = T_1^2 T_2 + T_1^{-2} T_2^{-1} + T_2^2 T_1 + T_2^{-2} T_1^{-1} + T_1 T_2^{-1} - T_1^{-1} T_2 - 2$$

```

pp[x_] := x + x^-1
u = pp[s] + pp[t] + pp[s t] - 2;
v = pp[s^2 t] + pp[s t^2] + pp[s t^-1] - 2;
Monomials_k[a_, b_] := Flatten@Table[a^m b^n, {m, 0, k}, {n, 0, k - m}]

```

```

In[*]:= (*This code is not optimal and runs too slowly!*)
ToUV[Q_] :=
Module[{P = Q /. {T1 -> s, T2 -> t}, deg, degs, degt, ShiftP, UVMons, Coefs, sol, eqs, cr},
  If[P == 0, Return[0]];
  deg = Exponent[P /. {t -> s}, s];
  UVMons = Expand[Monomials_deg[U, v]];
  degs = Exponent[P /. s -> 1/s, s];
  degt = Exponent[P /. t -> 1/t, t];

  degs = Max@Append[Table[Exponent[μ /. s -> 1/s, s], {μ, UVMons}], degs];
  degt = Max@Append[Table[Exponent[μ /. t -> 1/t, t], {μ, UVMons}], degt];
  UVMons = s^degs t^degt UVMons // Expand;
  ShiftP = Expand[P s^degs t^degt];

  Coefs = Table[f_i, {i, 1, Length[UVMons]}];
  cr = CoefficientRules[(UVMons.Coefs - ShiftP), {s, t}];
  eqs = cr /. {(r_ -> w_) -> w == 0};
  {sol} =
  Solve[eqs, Coefs];

  Monomials_deg[U, V].Coefs /. sol
]
ToUV[-1/T1^2 - T1^2 - 1/T2^2 - 1/T1^2 T2^2 + 1/T1 T2^2 + 1/T1^2 T2 + T1/T2 + T2/T1 + T1^2 T2 - T2^2 + T1 T2^2 - T1^2 T2^2]
Renorm[t_] := If[t == 0, 0, Sign[t] Log[Abs[t] + 10]]
DrawUVPol[P_] := Module[{Mat},
  If[P === 0, Return[P],
  Mat = Map[Renorm, Normal@SparseArray[CoefficientRules[U V P, {U, V}]], {2}]];
  MatrixPlot[Mat]
]

```

Out[\*]=  
 $12 - 2U - U^2 + 3V$

## Rolfsen table

```

UVTable = {#, ToUV[θ[#][2]]} & /@ AllKnots[{3, 10}];
Column[%]

```

Out[\*]=  
 $\{ \text{Knot}[3, 1], 12 - 2U - U^2 + 3V \}$   
 $\{ \text{Knot}[4, 1], 0 \}$   
 $\{ \text{Knot}[5, 1], -132 + 110U + 19U^2 - 12U^3 - 2U^4 - 73V + 30UV + 10U^2V - 10V^2 \}$   
 $\{ \text{Knot}[5, 2], 116 - 24U - 9U^2 + 31V \}$   
 $\{ \text{Knot}[6, 1], -28 + 8U + U^2 - 5V \}$   
 $\{ \text{Knot}[6, 2], 228 - 104U - 21U^2 + 8U^3 + U^4 + 99V - 23UV - 7U^2V + 11V^2 \}$

{Knot [6, 3], 0}  
 {Knot [7, 1], -792 - 1684 U + 526 U<sup>2</sup> + 408 U<sup>3</sup> - 26 U<sup>4</sup> - 30 U<sup>5</sup> - 3 U<sup>6</sup> -  
 94 V - 1086 U V - 5 U<sup>2</sup> V + 147 U<sup>3</sup> V + 21 U<sup>4</sup> V + 110 V<sup>2</sup> - 168 U V<sup>2</sup> - 42 U<sup>2</sup> V<sup>2</sup> + 21 V<sup>3</sup>}  
 {Knot [7, 2], 488 - 108 U - 36 U<sup>2</sup> + 130 V}  
 {Knot [7, 3], 1708 - 984 U - 227 U<sup>2</sup> + 98 U<sup>3</sup> + 17 U<sup>4</sup> + 865 V - 251 U V - 93 U<sup>2</sup> V + 109 V<sup>2</sup>}  
 {Knot [7, 4], -1120 + 256 U + 80 U<sup>2</sup> - 296 V}  
 {Knot [7, 5], -2192 + 942 U + 294 U<sup>2</sup> - 86 U<sup>3</sup> - 17 U<sup>4</sup> - 1114 V + 239 U V + 101 U<sup>2</sup> V - 141 V<sup>2</sup>}  
 {Knot [7, 6], 488 - 242 U - 22 U<sup>2</sup> + 14 U<sup>3</sup> + U<sup>4</sup> + 200 V - 53 U V - 9 U<sup>2</sup> V + 19 V<sup>2</sup>}  
 {Knot [7, 7], 44 - 14 U - U<sup>2</sup> + 7 V}  
 {Knot [8, 1], -196 + 54 U + 9 U<sup>2</sup> - 41 V}  
 {Knot [8, 2], -1308 + 2520 U - 289 U<sup>2</sup> - 430 U<sup>3</sup> + 18 U<sup>4</sup> + 24 U<sup>5</sup> + 2 U<sup>6</sup> -  
 1221 V + 1358 U V + 110 U<sup>2</sup> V - 138 U<sup>3</sup> V - 18 U<sup>4</sup> V - 360 V<sup>2</sup> + 180 U V<sup>2</sup> + 48 U<sup>2</sup> V<sup>2</sup> - 34 V<sup>3</sup>}  
 {Knot [8, 3], 0}  
 {Knot [8, 4], 1252 - 564 U - 133 U<sup>2</sup> + 46 U<sup>3</sup> + 7 U<sup>4</sup> + 567 V - 127 U V - 45 U<sup>2</sup> V + 65 V<sup>2</sup>}  
 {Knot [8, 5], 2852 - 2466 U - 183 U<sup>2</sup> + 404 U<sup>3</sup> + 15 U<sup>4</sup> - 20 U<sup>5</sup> - 2 U<sup>6</sup> +  
 2101 V - 1211 U V - 248 U<sup>2</sup> V + 112 U<sup>3</sup> V + 18 U<sup>4</sup> V + 515 V<sup>2</sup> - 148 U V<sup>2</sup> - 50 U<sup>2</sup> V<sup>2</sup> + 42 V<sup>3</sup>}  
 {Knot [8, 6], 1916 - 834 U - 189 U<sup>2</sup> + 64 U<sup>3</sup> + 9 U<sup>4</sup> + 887 V - 195 U V - 63 U<sup>2</sup> V + 103 V<sup>2</sup>}  
 {Knot [8, 7], -1160 + 926 U + 88 U<sup>2</sup> - 152 U<sup>3</sup> - 9 U<sup>4</sup> + 8 U<sup>5</sup> + U<sup>6</sup> -  
 956 V + 511 U V + 120 U<sup>2</sup> V - 49 U<sup>3</sup> V - 9 U<sup>4</sup> V - 259 V<sup>2</sup> + 70 U V<sup>2</sup> + 26 U<sup>2</sup> V<sup>2</sup> - 23 V<sup>3</sup>}  
 {Knot [8, 8], 52 - 38 U - 9 U<sup>2</sup> + 4 U<sup>3</sup> + U<sup>4</sup> + 61 V - 17 U V - 7 U<sup>2</sup> V + 13 V<sup>2</sup>}  
 {Knot [8, 9], 0}  
 {Knot [8, 10], -1492 + 764 U + 253 U<sup>2</sup> - 126 U<sup>3</sup> - 22 U<sup>4</sup> + 6 U<sup>5</sup> + U<sup>6</sup> -  
 1195 V + 410 U V + 170 U<sup>2</sup> V - 36 U<sup>3</sup> V - 9 U<sup>4</sup> V - 314 V<sup>2</sup> + 54 U V<sup>2</sup> + 27 U<sup>2</sup> V<sup>2</sup> - 27 V<sup>3</sup>}  
 {Knot [8, 11], 2136 - 966 U - 186 U<sup>2</sup> + 70 U<sup>3</sup> + 9 U<sup>4</sup> + 1008 V - 233 U V - 67 U<sup>2</sup> V + 119 V<sup>2</sup>}  
 {Knot [8, 12], 0}  
 {Knot [8, 13], 68 - 44 U - 9 U<sup>2</sup> + 4 U<sup>3</sup> + U<sup>4</sup> + 63 V - 17 U V - 7 U<sup>2</sup> V + 13 V<sup>2</sup>}  
 {Knot [8, 14], 2480 - 1186 U - 178 U<sup>2</sup> + 80 U<sup>3</sup> + 9 U<sup>4</sup> + 1166 V - 287 U V - 71 U<sup>2</sup> V + 135 V<sup>2</sup>}  
 {Knot [8, 15], -8732 + 3528 U + 1067 U<sup>2</sup> - 290 U<sup>3</sup> - 57 U<sup>4</sup> - 4629 V + 935 U V + 376 U<sup>2</sup> V - 613 V<sup>2</sup>}  
 {Knot [8, 16], 2060 - 1350 U - 161 U<sup>2</sup> + 184 U<sup>3</sup> + 12 U<sup>4</sup> - 8 U<sup>5</sup> - U<sup>6</sup> +  
 1583 V - 690 U V - 170 U<sup>2</sup> V + 55 U<sup>3</sup> V + 10 U<sup>4</sup> V + 408 V<sup>2</sup> - 89 U V<sup>2</sup> - 33 U<sup>2</sup> V<sup>2</sup> + 35 V<sup>3</sup>}  
 {Knot [8, 17], 0}  
 {Knot [8, 18], 0}  
 {Knot [8, 19], 4840 + 1188 U - 1410 U<sup>2</sup> - 410 U<sup>3</sup> + 81 U<sup>4</sup> + 36 U<sup>5</sup> + 3 U<sup>6</sup> +  
 2442 V + 1219 U V - 288 U<sup>2</sup> V - 192 U<sup>3</sup> V - 21 U<sup>4</sup> V + 273 V<sup>2</sup> + 240 U V<sup>2</sup> + 39 U<sup>2</sup> V<sup>2</sup> - 9 V<sup>3</sup>}  
 {Knot [8, 20], 72 - 14 U - 6 U<sup>2</sup> + 20 V}  
 {Knot [8, 21], 388 - 156 U - 31 U<sup>2</sup> + 10 U<sup>3</sup> + U<sup>4</sup> + 159 V - 33 U V - 8 U<sup>2</sup> V + 15 V<sup>2</sup>}  
 {Knot [9, 1], 27 304 + 3244 U - 18 946 U<sup>2</sup> - 2248 U<sup>3</sup> + 3438 U<sup>4</sup> + 674 U<sup>5</sup> - 171 U<sup>6</sup> -  
 56 U<sup>7</sup> - 4 U<sup>8</sup> + 19 442 V + 9882 U V - 10 085 U<sup>2</sup> V - 3721 U<sup>3</sup> V + 785 U<sup>4</sup> V + 396 U<sup>5</sup> V + 36 U<sup>6</sup> V +  
 4038 V<sup>2</sup> + 4520 U V<sup>2</sup> - 886 U<sup>2</sup> V<sup>2</sup> - 864 U<sup>3</sup> V<sup>2</sup> - 108 U<sup>4</sup> V<sup>2</sup> + 77 V<sup>3</sup> + 564 U V<sup>3</sup> + 120 U<sup>2</sup> V<sup>3</sup> - 36 V<sup>4</sup>}  
 {Knot [9, 2], 1400 - 320 U - 100 U<sup>2</sup> + 370 V}  
 {Knot [9, 3], 200 + 16 672 U - 3114 U<sup>2</sup> - 3642 U<sup>3</sup> + 118 U<sup>4</sup> + 244 U<sup>5</sup> + 25 U<sup>6</sup> - 3346 V +  
 10 150 U V + 611 U<sup>2</sup> V - 1255 U<sup>3</sup> V - 187 U<sup>4</sup> V - 1788 V<sup>2</sup> + 1514 U V<sup>2</sup> + 410 U<sup>2</sup> V<sup>2</sup> - 235 V<sup>3</sup>}



$$\begin{aligned}
& \{ \text{Knot}[9, 4], -6988 + 3756 U + 907 U^2 - 364 U^3 - 63 U^4 - 3493 V + 943 U V + 355 U^2 V - 435 V^2 \} \\
& \{ \text{Knot}[9, 5], -4580 + 1080 U + 315 U^2 - 1195 V \} \\
& \{ \text{Knot}[9, 6], 11544 - 19152 U + 606 U^2 + 3750 U^3 + 54 U^4 - 226 U^5 - 25 U^6 + 10842 V - \\
& \quad 10858 U V - 1583 U^2 V + 1213 U^3 V + 199 U^4 V + 3312 V^2 - 1532 U V^2 - 482 U^2 V^2 + 331 V^3 \} \\
& \{ \text{Knot}[9, 7], -9056 + 3710 U + 1162 U^2 - 322 U^3 - 63 U^4 - 4646 V + 949 U V + 395 U^2 V - 595 V^2 \} \\
& \{ \text{Knot}[9, 8], 1864 - 870 U - 138 U^2 + 58 U^3 + 7 U^4 + 884 V - 211 U V - 55 U^2 V + 105 V^2 \} \\
& \{ \text{Knot}[9, 9], 21576 - 19204 U - 2190 U^2 + 3604 U^3 + 246 U^4 - 202 U^5 - 25 U^6 + 16826 V - \\
& \quad 9962 U V - 2475 U^2 V + 1045 U^3 V + 199 U^4 V + 4374 V^2 - 1292 U V^2 - 494 U^2 V^2 + 379 V^3 \} \\
& \{ \text{Knot}[9, 10], 18776 - 8672 U - 2410 U^2 + 796 U^3 + 144 U^4 + 9346 V - 2156 U V - 856 U^2 V + 1160 V^2 \} \\
& \{ \text{Knot}[9, 11], 7284 - 7086 U + 253 U^2 + 912 U^3 - 35 U^4 - 36 U^5 - 2 U^6 + \\
& \quad 4781 V - 3051 U V - 311 U^2 V + 226 U^3 V + 22 U^4 V + 1003 V^2 - 312 U V^2 - 72 U^2 V^2 + 66 V^3 \} \\
& \{ \text{Knot}[9, 12], 3348 - 1680 U - 169 U^2 + 100 U^3 + 9 U^4 + 1487 V - 387 U V - 77 U^2 V + 159 V^2 \} \\
& \{ \text{Knot}[9, 13], 20488 - 8700 U - 2606 U^2 + 766 U^3 + 144 U^4 + 10346 V - 2190 U V - 892 U^2 V + 1304 V^2 \} \\
& \{ \text{Knot}[9, 14], 488 - 274 U + 2 U^2 + 10 U^3 + U^4 + 184 V - 51 U V - 9 U^2 V + 21 V^2 \} \\
& \{ \text{Knot}[9, 15], -4348 + 2186 U + 173 U^2 - 118 U^3 - 9 U^4 - 1815 V + 473 U V + 81 U^2 V - 175 V^2 \} \\
& \{ \text{Knot}[9, 16], -25832 + 20816 U + 2856 U^2 - 3720 U^3 - 291 U^4 + 198 U^5 + 25 U^6 - 20398 V + \\
& \quad 11003 U V + 2888 U^2 V - 1096 U^3 V - 211 U^4 V - 5369 V^2 + 1454 U V^2 + 565 U^2 V^2 - 471 V^3 \} \\
& \{ \text{Knot}[9, 17], 3488 - 3052 U + 108 U^2 + 360 U^3 - 14 U^4 - 14 U^5 - U^6 + \\
& \quad 2324 V - 1338 U V - 151 U^2 V + 97 U^3 V + 11 U^4 V + 522 V^2 - 148 U V^2 - 38 U^2 V^2 + 39 V^3 \} \\
& \{ \text{Knot}[9, 18], -21308 + 8848 U + 2661 U^2 - 758 U^3 - 144 U^4 - 11053 V + 2294 U V + 924 U^2 V - 1432 V^2 \} \\
& \{ \text{Knot}[9, 19], -212 + 190 U - 11 U^2 - 10 U^3 - U^4 - 133 V + 51 U V + 9 U^2 V - 21 V^2 \} \\
& \{ \text{Knot}[9, 20], -7616 + 5458 U + 366 U^2 - 716 U^3 - 9 U^4 + 28 U^5 + 2 U^6 - \\
& \quad 5114 V + 2485 U V + 421 U^2 V - 182 U^3 V - 22 U^4 V - 1129 V^2 + 280 U V^2 + 76 U^2 V^2 - 82 V^3 \} \\
& \{ \text{Knot}[9, 21], -5336 + 2758 U + 158 U^2 - 140 U^3 - 9 U^4 - 2136 V + 575 U V + 85 U^2 V - 191 V^2 \} \\
& \{ \text{Knot}[9, 22], -3356 + 2638 U - U^2 - 310 U^3 + 5 U^4 + 12 U^5 + U^6 - \\
& \quad 2319 V + 1204 U V + 169 U^2 V - 86 U^3 V - 11 U^4 V - 545 V^2 + 140 U V^2 + 39 U^2 V^2 - 43 V^3 \} \\
& \{ \text{Knot}[9, 23], -22460 + 9258 U + 2689 U^2 - 760 U^3 - 144 U^4 - 11903 V + 2456 U V + 960 U^2 V - 1576 V^2 \} \\
& \{ \text{Knot}[9, 24], 296 - 146 U - 4 U^2 + 6 U^3 + 112 V - 30 U V - 2 U^2 V + 8 V^2 \} \\
& \{ \text{Knot}[9, 25], 8508 - 4110 U - 569 U^2 + 266 U^3 + 30 U^4 + 4023 V - 993 U V - 240 U^2 V + 468 V^2 \} \\
& \{ \text{Knot}[9, 26], -3172 + 2364 U + 49 U^2 - 268 U^3 - 2 U^4 + 10 U^5 + U^6 - \\
& \quad 2279 V + 1106 U V + 179 U^2 V - 75 U^3 V - 11 U^4 V - 562 V^2 + 132 U V^2 + 40 U^2 V^2 - 47 V^3 \} \\
& \{ \text{Knot}[9, 27], 76 - 70 U + 17 U^2 + 2 U^3 - U^4 + 7 V - 13 U V + 5 U^2 V - 5 V^2 \} \\
& \{ \text{Knot}[9, 28], 2016 - 1572 U - 26 U^2 + 186 U^3 + 5 U^4 - 8 U^5 - U^6 + \\
& \quad 1764 V - 879 U V - 156 U^2 V + 64 U^3 V + 11 U^4 V + 519 V^2 - 124 U V^2 - 41 U^2 V^2 + 51 V^3 \} \\
& \{ \text{Knot}[9, 29], 2104 - 1572 U - 52 U^2 + 186 U^3 + 7 U^4 - 8 U^5 - U^6 + \\
& \quad 1838 V - 881 U V - 167 U^2 V + 64 U^3 V + 11 U^4 V + 535 V^2 - 124 U V^2 - 41 U^2 V^2 + 51 V^3 \} \\
& \{ \text{Knot}[9, 30], 44 - 52 U - U^2 + 6 U^3 + 25 V - 17 U V - U^2 V + 2 V^2 \} \\
& \{ \text{Knot}[9, 31], 1464 - 1208 U + 22 U^2 + 124 U^3 + 8 U^4 - 6 U^5 - U^6 + \\
& \quad 1506 V - 748 U V - 141 U^2 V + 53 U^3 V + 11 U^4 V + 504 V^2 - 116 U V^2 - 42 U^2 V^2 + 55 V^3 \}
\end{aligned}$$

$$\begin{aligned}
& \{ \text{Knot} [9, 32], -5704 + 4178 U - 10 U^2 - 430 U^3 + 11 U^4 + 14 U^5 + U^6 - \\
& \quad 3668 V + 1814 UV + 204 U^2 V - 109 U^3 V - 12 U^4 V - 799 V^2 + 199 U V^2 + 47 U^2 V^2 - 59 V^3 \} \\
& \{ \text{Knot} [9, 33], 460 - 220 U - 27 U^2 + 14 U^3 + U^4 + 185 V - 48 UV - 8 U^2 V + 15 V^2 \} \\
& \{ \text{Knot} [9, 34], -64 + 110 U - 50 U^2 + 4 U^3 + U^4 - 2 V + 14 UV - 5 U^2 V + V^2 \} \\
& \{ \text{Knot} [9, 35], 7416 - 1764 U - 504 U^2 + 1926 V \} \\
& \{ \text{Knot} [9, 36], 7852 - 6428 U - 117 U^2 + 830 U^3 - 10 U^4 - 32 U^5 - 2 U^6 + \\
& \quad 5129 V - 2803 UV - 383 U^2 V + 204 U^3 V + 22 U^4 V + 1086 V^2 - 296 U V^2 - 74 U^2 V^2 + 74 V^3 \} \\
& \{ \text{Knot} [9, 37], -324 + 220 U - 5 U^2 - 10 U^3 - U^4 - 159 V + 51 UV + 9 U^2 V - 21 V^2 \} \\
& \{ \text{Knot} [9, 38], -43528 + 17998 U + 5092 U^2 - 1456 U^3 - 270 U^4 - 22868 V + 4732 UV + 1815 U^2 V - 3002 V^2 \} \\
& \{ \text{Knot} [9, 39], -11232 + 5794 U + 502 U^2 - 334 U^3 - 30 U^4 - 5034 V + 1334 UV + 259 U^2 V - 544 V^2 \} \\
& \{ \text{Knot} [9, 40], 8468 - 6454 U + 235 U^2 + 600 U^3 - 30 U^4 - 18 U^5 - U^6 + \\
& \quad 5317 V - 2760 UV - 198 U^2 V + 148 U^3 V + 13 U^4 V + 1100 V^2 - 290 U V^2 - 55 U^2 V^2 + 75 V^3 \} \\
& \{ \text{Knot} [9, 41], -892 + 604 U - 13 U^2 - 28 U^3 - 3 U^4 - 441 V + 143 UV + 27 U^2 V - 63 V^2 \} \\
& \{ \text{Knot} [9, 42], -144 + 92 U + 12 U^2 - 8 U^3 - U^4 - 60 V + 20 UV + 6 U^2 V - 7 V^2 \} \\
& \{ \text{Knot} [9, 43], -1032 - 2340 U + 866 U^2 + 438 U^3 - 55 U^4 - 28 U^5 - 2 U^6 - \\
& \quad 6 V - 1460 UV + 53 U^2 V + 164 U^3 V + 18 U^4 V + 169 V^2 - 212 U V^2 - 46 U^2 V^2 + 26 V^3 \} \\
& \{ \text{Knot} [9, 44], 92 - 10 U - 11 U^2 + 27 V + UV \} \\
& \{ \text{Knot} [9, 45], 1216 - 512 U - 52 U^2 + 22 U^3 + U^4 + 412 V - 86 UV - 10 U^2 V + 23 V^2 \} \\
& \{ \text{Knot} [9, 46], -84 + 24 U + 3 U^2 - 15 V \} \\
& \{ \text{Knot} [9, 47], -1704 + 1864 U - 148 U^2 - 250 U^3 + 12 U^4 + 12 U^5 + U^6 - \\
& \quad 1246 V + 902 UV + 90 U^2 V - 79 U^3 V - 10 U^4 V - 314 V^2 + 113 UV^2 + 31 U^2 V^2 - 27 V^3 \} \\
& \{ \text{Knot} [9, 48], -1292 + 636 U + 29 U^2 - 28 U^3 - U^4 - 445 V + 115 UV + 11 U^2 V - 27 V^2 \} \\
& \{ \text{Knot} [9, 49], 7624 - 3364 U - 986 U^2 + 304 U^3 + 57 U^4 + 3774 V - 830 UV - 339 U^2 V + 465 V^2 \} \\
& \{ \text{Knot} [10, 1], -712 + 192 U + 36 U^2 - 158 V \} \\
& \{ \text{Knot} [10, 2], -27368 - 20240 U + 22594 U^2 + 5298 U^3 - 3592 U^4 - 788 U^5 + 153 U^6 + \\
& \quad 48 U^7 + 3 U^8 - 15110 V - 22936 UV + 9961 U^2 V + 5240 U^3 V - 646 U^4 V - 393 U^5 V - 33 U^6 V - \\
& \quad 1294 V^2 - 7558 UV^2 + 365 U^2 V^2 + 996 U^3 V^2 + 123 U^4 V^2 + 469 V^3 - 771 UV^3 - 174 U^2 V^3 + 69 V^4 \} \\
& \{ \text{Knot} [10, 3], -820 + 216 U + 45 U^2 - 191 V \} \\
& \{ \text{Knot} [10, 4], 3052 - 1366 U - 333 U^2 + 112 U^3 + 18 U^4 + 1375 V - 304 UV - 112 U^2 V + 156 V^2 \} \\
& \{ \text{Knot} [10, 5], -1540 - 15176 U + 6661 U^2 + 3966 U^3 - 1102 U^4 - 482 U^5 + 34 U^6 + \\
& \quad 24 U^7 + 2 U^8 + 1741 V - 14850 UV + 2390 U^2 V + 3120 U^3 V - 74 U^4 V - 206 U^5 V - 22 U^6 V + \\
& \quad 2188 V^2 - 4734 UV^2 - 342 U^2 V^2 + 568 U^3 V^2 + 86 U^4 V^2 + 678 V^3 - 494 UV^3 - 136 U^2 V^3 + 66 V^4 \} \\
& \{ \text{Knot} [10, 6], -14976 + 20686 U - 1208 U^2 - 3466 U^3 + 63 U^4 + 188 U^5 + 17 U^6 - 12566 V + \\
& \quad 11001 UV + 1280 U^2 V - 1093 U^3 V - 153 U^4 V - 3459 V^2 + 1450 UV^2 + 416 U^2 V^2 - 313 V^3 \} \\
& \{ \text{Knot} [10, 7], 8668 - 3994 U - 713 U^2 + 280 U^3 + 36 U^4 + 4199 V - 986 UV - 274 U^2 V + 506 V^2 \} \\
& \{ \text{Knot} [10, 8], -6352 + 14676 U - 1626 U^2 - 2710 U^3 + 74 U^4 + 160 U^5 + 15 U^6 - 6560 V + \\
& \quad 8274 UV + 743 U^2 V - 895 U^3 V - 127 U^4 V - 2104 V^2 + 1154 UV^2 + 320 U^2 V^2 - 215 V^3 \} \\
& \{ \text{Knot} [10, 9], -6872 + 10114 U - 1140 U^2 - 2558 U^3 + 337 U^4 + 272 U^5 - \\
& \quad 9 U^6 - 12 U^7 - U^8 - 7476 V + 8325 UV + 280 U^2 V - 1618 U^3 V - 50 U^4 V + 97 U^5 V + 11 U^6 V - \\
& \quad 3075 V^2 + 2286 UV^2 + 419 U^2 V^2 - 252 U^3 V^2 - 43 U^4 V^2 - 565 V^3 + 209 UV^3 + 70 U^2 V^3 - 39 V^4 \} \\
& \{ \text{Knot} [10, 10], 1368 - 710 U - 114 U^2 + 50 U^3 + 9 U^4 + 832 V - 207 UV - 67 U^2 V + 129 V^2 \}
\end{aligned}$$

$$\begin{aligned}
& \{ \text{Knot} [10, 11], 11920 - 5064 U - 1286 U^2 + 402 U^3 + 64 U^4 + 5652 V - 1198 UV - 428 U^2 V + 672 V^2 \} \\
& \{ \text{Knot} [10, 12], -11576 + 8554 U + 1148 U^2 - 1414 U^3 - 105 U^4 + 72 U^5 + 9 U^6 - \\
& \quad 9204 V + 4565 UV + 1186 U^2 V - 429 U^3 V - 81 U^4 V - 2423 V^2 + 606 UV^2 + 234 U^2 V^2 - 211 V^3 \} \\
& \{ \text{Knot} [10, 13], -1992 + 898 U + 26 U^2 - 24 U^3 - U^4 - 584 V + 117 UV + 11 U^2 V - 29 V^2 \} \\
& \{ \text{Knot} [10, 14], -35020 + 31044 U + 467 U^2 - 4474 U^3 + 8 U^4 + 204 U^5 + 17 U^6 - 25189 V + \\
& \quad 14920 UV + 2287 U^2 V - 1261 U^3 V - 169 U^4 V - 5998 V^2 + 1778 UV^2 + 520 U^2 V^2 - 473 V^3 \} \\
& \{ \text{Knot} [10, 15], -8456 + 7650 U + 360 U^2 - 1238 U^3 - 39 U^4 + 64 U^5 + 7 U^6 - \\
& \quad 6664 V + 4037 UV + 774 U^2 V - 383 U^3 V - 63 U^4 V - 1735 V^2 + 530 UV^2 + 178 U^2 V^2 - 149 V^3 \} \\
& \{ \text{Knot} [10, 16], -12400 + 5264 U + 1298 U^2 - 408 U^3 - 64 U^4 - 5964 V + 1268 UV + 440 U^2 V - 720 V^2 \} \\
& \{ \text{Knot} [10, 17], 0 \} \\
& \{ \text{Knot} [10, 18], 13316 - 6032 U - 1231 U^2 + 446 U^3 + 64 U^4 + 6659 V - 1526 UV - 468 U^2 V + 832 V^2 \} \\
& \{ \text{Knot} [10, 19], 11168 - 9860 U - 220 U^2 + 1452 U^3 + 18 U^4 - 70 U^5 - 7 U^6 + \\
& \quad 8556 V - 5000 UV - 863 U^2 V + 441 U^3 V + 67 U^4 V + 2168 V^2 - 632 UV^2 - 202 U^2 V^2 + 181 V^3 \} \\
& \{ \text{Knot} [10, 20], 7352 - 3168 U - 744 U^2 + 244 U^3 + 36 U^4 + 3506 V - 762 UV - 252 U^2 V + 418 V^2 \} \\
& \{ \text{Knot} [10, 21], -22128 + 25450 U - 1048 U^2 - 3950 U^3 + 79 U^4 + 200 U^5 + 17 U^6 - 17270 V + \\
& \quad 12945 UV + 1588 U^2 V - 1201 U^3 V - 161 U^4 V - 4443 V^2 + 1630 UV^2 + 464 U^2 V^2 - 377 V^3 \} \\
& \{ \text{Knot} [10, 22], 1512 - 910 U - 260 U^2 + 166 U^3 + 21 U^4 - 8 U^5 - U^6 + \\
& \quad 1148 V - 455 UV - 170 U^2 V + 43 U^3 V + 9 U^4 V + 293 V^2 - 58 UV^2 - 26 U^2 V^2 + 25 V^3 \} \\
& \{ \text{Knot} [10, 23], -14076 + 9486 U + 1477 U^2 - 1470 U^3 - 126 U^4 + 70 U^5 + 9 U^6 - \\
& \quad 11243 V + 5020 UV + 1393 U^2 V - 439 U^3 V - 85 U^4 V - 2970 V^2 + 660 UV^2 + 262 U^2 V^2 - 259 V^3 \} \\
& \{ \text{Knot} [10, 24], 17908 - 8096 U - 1581 U^2 + 582 U^3 + 80 U^4 + 8815 V - 2022 UV - 596 U^2 V + 1080 V^2 \} \\
& \{ \text{Knot} [10, 25], -37656 + 26548 U + 3002 U^2 - 3904 U^3 - 190 U^4 + 172 U^5 + 17 U^6 - 27494 V + \\
& \quad 13006 UV + 2923 U^2 V - 1069 U^3 V - 169 U^4 V - 6666 V^2 + 1586 UV^2 + 536 U^2 V^2 - 537 V^3 \} \\
& \{ \text{Knot} [10, 26], 1320 - 786 U - 264 U^2 + 160 U^3 + 21 U^4 - 8 U^5 - U^6 + \\
& \quad 1032 V - 417 UV - 166 U^2 V + 43 U^3 V + 9 U^4 V + 277 V^2 - 58 UV^2 - 26 U^2 V^2 + 25 V^3 \} \\
& \{ \text{Knot} [10, 27], 16308 - 11020 U - 1493 U^2 + 1602 U^3 + 122 U^4 - 72 U^5 - 9 U^6 + \\
& \quad 13035 V - 5796 UV - 1505 U^2 V + 477 U^3 V + 89 U^4 V + 3470 V^2 - 762 UV^2 - 290 U^2 V^2 + 307 V^3 \} \\
& \{ \text{Knot} [10, 28], 1808 - 1016 U - 194 U^2 + 86 U^3 + 16 U^4 + 1284 V - 338 UV - 116 U^2 V + 216 V^2 \} \\
& \{ \text{Knot} [10, 29], 13404 - 9146 U - 205 U^2 + 906 U^3 - 21 U^4 - 24 U^5 - U^6 + \\
& \quad 7311 V - 3347 UV - 366 U^2 V + 175 U^3 V + 13 U^4 V + 1249 V^2 - 290 UV^2 - 52 U^2 V^2 + 63 V^3 \} \\
& \{ \text{Knot} [10, 30], 23340 - 11634 U - 1405 U^2 + 730 U^3 + 80 U^4 + 11123 V - 2822 UV - 652 U^2 V + 1304 V^2 \} \\
& \{ \text{Knot} [10, 31], -252 + 176 U - 15 U^2 - 6 U^3 - 125 V + 42 UV + 4 U^2 V - 16 V^2 \} \\
& \{ \text{Knot} [10, 32], -96 + 164 U + 176 U^2 - 116 U^3 - 16 U^4 + 8 U^5 + U^6 - \\
& \quad 492 V + 276 UV + 131 U^2 V - 43 U^3 V - 9 U^4 V - 220 V^2 + 58 UV^2 + 26 U^2 V^2 - 25 V^3 \} \\
& \{ \text{Knot} [10, 33], 0 \} \\
& \{ \text{Knot} [10, 34], 1036 - 504 U - 129 U^2 + 44 U^3 + 9 U^4 + 697 V - 165 UV - 63 U^2 V + 113 V^2 \} \\
& \{ \text{Knot} [10, 35], 1384 - 742 U + 10 U^2 + 24 U^3 + U^4 + 436 V - 117 UV - 11 U^2 V + 29 V^2 \} \\
& \{ \text{Knot} [10, 36], 11224 - 5552 U - 660 U^2 + 344 U^3 + 36 U^4 + 5226 V - 1322 UV - 296 U^2 V + 594 V^2 \} \\
& \{ \text{Knot} [10, 37], 0 \} \\
& \{ \text{Knot} [10, 38], 19528 - 9164 U - 1528 U^2 + 628 U^3 + 80 U^4 + 9562 V - 2280 UV - 616 U^2 V + 1160 V^2 \}
\end{aligned}$$

$$\begin{aligned}
& \{ \text{Knot} [10, 39], -36532 + 28850U + 1763U^2 - 4194U^3 - 92U^4 + 188U^5 + 17U^6 - 26393V + \\
& \quad 13966UV + 2609U^2V - 1165U^3V - 169U^4V - 6332V^2 + 1682UV^2 + 528U^2V^2 - 505V^3 \} \\
& \{ \text{Knot} [10, 40], -15024 + 9324U + 1798U^2 - 1400U^3 - 156U^4 + 64U^5 + 9U^6 - \\
& \quad 12616V + 5176UV + 1571U^2V - 429U^3V - 89U^4V - 3508V^2 + 714UV^2 + 294U^2V^2 - 323V^3 \} \\
& \{ \text{Knot} [10, 41], 9880 - 7166U + 114U^2 + 682U^3 - 29U^4 - 20U^5 - U^6 + \\
& \quad 5784V - 2885UV - 238U^2V + 157U^3V + 13U^4V + 1119V^2 - 290UV^2 - 54U^2V^2 + 71V^3 \} \\
& \{ \text{Knot} [10, 42], -1340 + 692U + 85U^2 - 44U^3 - 6U^4 - 729V + 186UV + 48U^2V - 98V^2 \} \\
& \{ \text{Knot} [10, 43], 0 \} \\
& \{ \text{Knot} [10, 44], 6092 - 5434U + 553U^2 + 472U^3 - 39U^4 - 16U^5 - U^6 + \\
& \quad 4179V - 2501UV - 100U^2V + 139U^3V + 13U^4V + 981V^2 - 290UV^2 - 56U^2V^2 + 79V^3 \} \\
& \{ \text{Knot} [10, 45], 0 \} \\
& \{ \text{Knot} [10, 46], 96 + 29438U - 13068U^2 - 7214U^3 + 2296U^4 + 842U^5 - 86U^6 - 42U^7 - \\
& \quad 3U^8 - 6182V + 26052UV - 4254U^2V - 5261U^3V + 215U^4V + 342U^5V + 33U^6V - 4608V^2 + \\
& \quad 7471UV^2 + 527U^2V^2 - 876U^3V^2 - 126U^4V^2 - 1136V^3 + 699UV^3 + 192U^2V^3 - 93V^4 \} \\
& \{ \text{Knot} [10, 47], 7756 - 16052U + 1935U^2 + 4266U^3 - 389U^4 - 468U^5 - 3U^6 + 20U^7 + \\
& \quad 2U^8 + 9957V - 14581UV - 449U^2V + 2902U^3V + 156U^4V - 172U^5V - 22U^6V + 4809V^2 - \\
& \quad 4419UV^2 - 805U^2V^2 + 488U^3V^2 + 88U^4V^2 + 1029V^3 - 446UV^3 - 148U^2V^3 + 82V^4 \} \\
& \{ \text{Knot} [10, 48], 512 - 972U + 86U^2 + 174U^3 - 3U^4 - 10U^5 - U^6 + \\
& \quad 428V - 525UV - 48U^2V + 56U^3V + 8U^4V + 119V^2 - 71UV^2 - 19U^2V^2 + 11V^3 \} \\
& \{ \text{Knot} [10, 49], 86992 - 76830U - 6966U^2 + 13398U^3 + 750U^4 - 712U^5 - 84U^6 + 69226V - \\
& \quad 40836UV - 9238U^2V + 4041U^3V + 724U^4V + 18342V^2 - 5421UV^2 - 1964U^2V^2 + 1618V^3 \} \\
& \{ \text{Knot} [10, 50], 30460 - 23056U - 2349U^2 + 3560U^3 + 169U^4 - 166U^5 - 17U^6 + 22393V - \\
& \quad 11346UV - 2530U^2V + 988U^3V + 161U^4V + 5473V^2 - 1390UV^2 - 481U^2V^2 + 445V^3 \} \\
& \{ \text{Knot} [10, 51], -14704 + 7072U + 2628U^2 - 1142U^3 - 226U^4 + 52U^5 + 9U^6 - \\
& \quad 12120V + 3909UV + 1715U^2V - 326U^3V - 85U^4V - 3292V^2 + 532UV^2 + 271U^2V^2 - 295V^3 \} \\
& \{ \text{Knot} [10, 52], -13404 + 8546U + 1411U^2 - 1258U^3 - 110U^4 + 56U^5 + 7U^6 - \\
& \quad 10131V + 4293UV + 1195U^2V - 354U^3V - 67U^4V - 2534V^2 + 536UV^2 + 209U^2V^2 - 209V^3 \} \\
& \{ \text{Knot} [10, 53], -81748 + 34626U + 9007U^2 - 2704U^3 - 483U^4 - 43397V + 9204UV + 3348U^2V - 5757V^2 \} \\
& \{ \text{Knot} [10, 54], -10360 + 7478U + 994U^2 - 1190U^3 - 85U^4 + 58U^5 + 7U^6 - \\
& \quad 7828V + 3808UV + 965U^2V - 344U^3V - 63U^4V - 1955V^2 + 482UV^2 + 181U^2V^2 - 161V^3 \} \\
& \{ \text{Knot} [10, 55], -48600 + 20532U + 5380U^2 - 1602U^3 - 290U^4 - 25962V + 5489UV + 2010U^2V - 3466V^2 \} \\
& \{ \text{Knot} [10, 56], 37896 - 26396U - 3132U^2 + 3874U^3 + 202U^4 - 170U^5 - 17U^6 + 27614V - \\
& \quad 12889UV - 2962U^2V + 1056U^3V + 169U^4V + 6696V^2 - 1570UV^2 - 537U^2V^2 + 541V^3 \} \\
& \{ \text{Knot} [10, 57], -14104 + 7556U + 2204U^2 - 1166U^3 - 200U^4 + 54U^5 + 9U^6 - \\
& \quad 12362V + 4455UV + 1670U^2V - 368U^3V - 89U^4V - 3580V^2 + 650UV^2 + 299U^2V^2 - 343V^3 \} \\
& \{ \text{Knot} [10, 58], -3036 + 1660U - 15U^2 - 58U^3 - 3U^4 - 1049V + 287UV + 32U^2V - 83V^2 \} \\
& \{ \text{Knot} [10, 59], -8004 + 6268U - 293U^2 - 582U^3 + 32U^4 + 18U^5 + U^6 - \\
& \quad 5063V + 2702UV + 182U^2V - 148U^3V - 13U^4V - 1070V^2 + 290UV^2 + 55U^2V^2 - 75V^3 \} \\
& \{ \text{Knot} [10, 60], -652 + 454U - 53U^2 - 8U^3 - U^4 - 231V + 75UV + 10U^2V - 29V^2 \} \\
& \{ \text{Knot} [10, 61], 12748 - 14976U - 115U^2 + 2658U^3 + 46U^4 - 146U^5 - 15U^6 + 10241V - \\
& \quad 7846UV - 1284U^2V + 800U^3V + 127U^4V + 2736V^2 - 1026UV^2 - 327U^2V^2 + 243V^3 \}
\end{aligned}$$

$$\begin{aligned}
& \{ \text{Knot} [10, 62], 17108 - 19374 U - 65 U^2 + 4804 U^3 - 236 U^4 - 488 U^5 - 7 U^6 + 20 U^7 + 2 U^8 + \\
& \quad 18373 V - 15806 UV - 2036 U^2 V + 2952 U^3 V + 237 U^4 V - 166 U^5 V - 22 U^6 V + 7416 V^2 - \\
& \quad 4300 U V^2 - 1101 U^2 V^2 + 448 U^3 V^2 + 88 U^4 V^2 + 1333 V^3 - 390 U V^3 - 150 U^2 V^3 + 90 V^4 \} \\
& \{ \text{Knot} [10, 63], -46488 + 19336 U + 5434 U^2 - 1568 U^3 - 290 U^4 - 24530 V + 5108 UV + 1952 U^2 V - 3234 V^2 \} \\
& \{ \text{Knot} [10, 64], -18172 + 12658 U + 2635 U^2 - 3008 U^3 - 128 U^4 + 274 U^5 + 12 U^6 - \\
& \quad 10 U^7 - U^8 - 16767 V + 8796 UV + 2631 U^2 V - 1520 U^3 V - 208 U^4 V + 77 U^5 V + 11 U^6 V - \\
& \quad 5792 V^2 + 2036 U V^2 + 800 U^2 V^2 - 192 U^3 V^2 - 44 U^4 V^2 - 888 V^3 + 157 U V^3 + 77 U^2 V^3 - 51 V^4 \} \\
& \{ \text{Knot} [10, 65], -14436 + 8180 U + 2117 U^2 - 1292 U^3 - 182 U^4 + 60 U^5 + 9 U^6 - \\
& \quad 11751 V + 4412 UV + 1576 U^2 V - 376 U^3 V - 85 U^4 V - 3154 V^2 + 588 UV^2 + 267 U^2 V^2 - 279 V^3 \} \\
& \{ \text{Knot} [10, 66], 120540 - 76232 U - 16785 U^2 + 12766 U^3 + 1447 U^4 - 620 U^5 - 84 U^6 + 93005 V - \\
& \quad 39261 UV - 12768 U^2 V + 3580 U^3 V + 750 U^4 V + 23887 V^2 - 5048 UV^2 - 2174 U^2 V^2 + 2042 V^3 \} \\
& \{ \text{Knot} [10, 67], 21568 - 10440 U - 1474 U^2 + 680 U^3 + 80 U^4 + 10408 V - 2562 UV - 636 U^2 V + 1240 V^2 \} \\
& \{ \text{Knot} [10, 68], -2156 + 1256 U + 173 U^2 - 94 U^3 - 16 U^4 - 1425 V + 388 UV + 120 U^2 V - 232 V^2 \} \\
& \{ \text{Knot} [10, 69], -6656 + 6250 U - 1044 U^2 - 370 U^3 + 49 U^4 + 12 U^5 + U^6 - \\
& \quad 4154 V + 2621 UV - 6 U^2 V - 121 U^3 V - 13 U^4 V - 961 V^2 + 290 UV^2 + 58 U^2 V^2 - 87 V^3 \} \\
& \{ \text{Knot} [10, 70], -11560 + 8094 U + 36 U^2 - 788 U^3 + 26 U^4 + 22 U^5 + U^6 - \\
& \quad 6512 V + 3103 UV + 297 U^2 V - 166 U^3 V - 13 U^4 V - 1180 V^2 + 290 UV^2 + 53 U^2 V^2 - 67 V^3 \} \\
& \{ \text{Knot} [10, 71], -912 + 396 U + 94 U^2 - 30 U^3 - 5 U^4 - 476 V + 104 UV + 35 U^2 V - 61 V^2 \} \\
& \{ \text{Knot} [10, 72], 46192 - 34754 U - 2222 U^2 + 4802 U^3 + 88 U^4 - 202 U^5 - 17 U^6 + 32770 V - \\
& \quad 16559 UV - 2990 U^2 V + 1298 U^3 V + 177 U^4 V + 7690 V^2 - 1958 UV^2 - 583 U^2 V^2 + 597 V^3 \} \\
& \{ \text{Knot} [10, 73], 7416 - 6250 U + 692 U^2 + 452 U^3 - 40 U^4 - 14 U^5 - U^6 + \\
& \quad 4648 V - 2659 UV - 77 U^2 V + 130 U^3 V + 13 U^4 V + 1024 V^2 - 290 UV^2 - 57 U^2 V^2 + 83 V^3 \} \\
& \{ \text{Knot} [10, 74], 20648 - 10048 U - 1452 U^2 + 668 U^3 + 80 U^4 + 10102 V - 2500 UV - 632 U^2 V + 1224 V^2 \} \\
& \{ \text{Knot} [10, 75], -68 - 96 U + 35 U^2 + 2 U^3 + 2 U^4 + 77 V - 38 UV - 16 U^2 V + 36 V^2 \} \\
& \{ \text{Knot} [10, 76], 32872 - 21276 U - 3740 U^2 + 3312 U^3 + 275 U^4 - 150 U^5 - 17 U^6 + 24090 V - \\
& \quad 10441 UV - 2908 U^2 V + 888 U^3 V + 161 U^4 V + 5875 V^2 - 1278 UV^2 - 489 U^2 V^2 + 477 V^3 \} \\
& \{ \text{Knot} [10, 77], -14236 + 8094 U + 2119 U^2 - 1292 U^3 - 182 U^4 + 60 U^5 + 9 U^6 - \\
& \quad 11579 V + 4376 UV + 1568 U^2 V - 376 U^3 V - 85 U^4 V - 3122 V^2 + 588 UV^2 + 267 U^2 V^2 - 279 V^3 \} \\
& \{ \text{Knot} [10, 78], -18756 + 12582 U + 589 U^2 - 1372 U^3 + 7 U^4 + 44 U^5 + 2 U^6 - \\
& \quad 11881 V + 5487 UV + 668 U^2 V - 320 U^3 V - 26 U^4 V - 2351 V^2 + 572 UV^2 + 106 U^2 V^2 - 138 V^3 \} \\
& \{ \text{Knot} [10, 79], 0 \} \\
& \{ \text{Knot} [10, 80], 106640 - 80318 U - 11148 U^2 + 13504 U^3 + 1022 U^4 - 682 U^5 - 84 U^6 + 84006 V - \\
& \quad 42337 UV - 11066 U^2 V + 3989 U^3 V + 750 U^4 V + 22026 V^2 - 5572 UV^2 - 2144 U^2 V^2 + 1922 V^3 \} \\
& \{ \text{Knot} [10, 81], 0 \} \\
& \{ \text{Knot} [10, 82], 15424 - 15076 U - 340 U^2 + 3436 U^3 - 199 U^4 - 316 U^5 + 2 U^6 + \\
& \quad 12 U^7 + U^8 + 15700 V - 11829 UV - 1529 U^2 V + 2013 U^3 V + 129 U^4 V - 104 U^5 V - 12 U^6 V + \\
& \quad 5969 V^2 - 3073 U V^2 - 747 U^2 V^2 + 292 U^3 V^2 + 52 U^4 V^2 + 1004 V^3 - 264 UV^3 - 96 U^2 V^3 + 63 V^4 \} \\
& \{ \text{Knot} [10, 83], -21208 + 14230 U + 1506 U^2 - 1882 U^3 - 107 U^4 + 78 U^5 + 9 U^6 - \\
& \quad 16372 V + 7258 UV + 1656 U^2 V - 549 U^3 V - 94 U^4 V - 4239 V^2 + 931 UV^2 + 325 U^2 V^2 - 367 V^3 \} \\
& \{ \text{Knot} [10, 84], -18696 + 12188 U + 1600 U^2 - 1644 U^3 - 131 U^4 + 70 U^5 + 9 U^6 - \\
& \quad 15334 V + 6588 UV + 1655 U^2 V - 503 U^3 V - 94 U^4 V - 4197 V^2 + 891 UV^2 + 329 U^2 V^2 - 383 V^3 \}
\end{aligned}$$

$$\begin{aligned}
& \{ \text{Knot} [10, 85], -18412 + 27860U - 4601U^2 - 5840U^3 + 971U^4 + 562U^5 - 26U^6 - 24U^7 - \\
& \quad 2U^8 - 20445V + 23023UV - 45U^2V - 3944U^3V - 63U^4V + 220U^5V + 24U^6V - 8577V^2 + \\
& \quad 6378UV^2 + 1015U^2V^2 - 644U^3V^2 - 104U^4V^2 - 1610V^3 + 592UV^3 + 188U^2V^3 - 114V^4 \} \\
& \{ \text{Knot} [10, 86], 796 - 442U - 237U^2 + 130U^3 + 20U^4 - 8U^5 - U^6 + \\
& \quad 971V - 413UV - 169U^2V + 49U^3V + 10U^4V + 344V^2 - 79UV^2 - 33U^2V^2 + 37V^3 \} \\
& \{ \text{Knot} [10, 87], 548 - 266U - 275U^2 + 128U^3 + 22U^4 - 8U^5 - U^6 + \\
& \quad 945V - 391UV - 179U^2V + 49U^3V + 10U^4V + 354V^2 - 79UV^2 - 33U^2V^2 + 37V^3 \} \\
& \{ \text{Knot} [10, 88], 0 \} \\
& \{ \text{Knot} [10, 89], 14308 - 11342U + 1137U^2 + 760U^3 - 70U^4 - 20U^5 - U^6 + \\
& \quad 8145V - 4422UV - 70U^2V + 187U^3V + 14U^4V + 1526V^2 - 421UV^2 - 65U^2V^2 + 99V^3 \} \\
& \{ \text{Knot} [10, 90], 1788 - 862U - 323U^2 + 158U^3 + 24U^4 - 8U^5 - U^6 + \\
& \quad 1415V - 507UV - 197U^2V + 49U^3V + 10U^4V + 392V^2 - 79UV^2 - 33U^2V^2 + 37V^3 \} \\
& \{ \text{Knot} [10, 91], 768 - 460U - 202U^2 + 106U^3 + 21U^4 - 6U^5 - U^6 + \\
& \quad 636V - 257UV - 129U^2V + 30U^3V + 8U^4V + 171V^2 - 35UV^2 - 20U^2V^2 + 15V^3 \} \\
& \{ \text{Knot} [10, 92], 55132 - 38538U - 3175U^2 + 5106U^3 + 137U^4 - 204U^5 - 17U^6 + 39343V - \\
& \quad 18559UV - 3461U^2V + 1371U^3V + 185U^4V + 9287V^2 - 2222UV^2 - 647U^2V^2 + 725V^3 \} \\
& \{ \text{Knot} [10, 93], 15996 - 10902U - 1159U^2 + 1498U^3 + 78U^4 - 64U^5 - 7U^6 + 11759V - \\
& \quad 5327UV - 1217U^2V + 421U^3V + 70U^4V + 2876V^2 - 651UV^2 - 227U^2V^2 + 233V^3 \} \\
& \{ \text{Knot} [10, 94], -16536 + 13442U + 1934U^2 - 3136U^3 - 88U^4 + 284U^5 + 13U^6 - 10U^7 - \\
& \quad U^8 - 16876V + 10644UV + 2384U^2V - 1792U^3V - 208U^4V + 88U^5V + 12U^6V - 6478V^2 + \\
& \quad 2815UV^2 + 881U^2V^2 - 258U^3V^2 - 53U^4V^2 - 1107V^3 + 248UV^3 + 102U^2V^3 - 71V^4 \} \\
& \{ \text{Knot} [10, 95], -16332 + 9640U + 1905U^2 - 1320U^3 - 177U^4 + 58U^5 + 9U^6 - \\
& \quad 14225V + 5529UV + 1707U^2V - 423U^3V - 93U^4V - 4099V^2 + 788UV^2 + 327U^2V^2 - 391V^3 \} \\
& \{ \text{Knot} [10, 96], 2376 - 1388U + 112U^2 + 28U^3 - U^4 + 694V - 206UV - 4U^2V + 39V^2 \} \\
& \{ \text{Knot} [10, 97], -47488 + 24136U + 2418U^2 - 1426U^3 - 145U^4 - 22036V + 5692UV + 1215U^2V - 2503V^2 \} \\
& \{ \text{Knot} [10, 98], -43604 + 27596U + 4227U^2 - 3916U^3 - 276U^4 + 164U^5 + 17U^6 - 32539V + \\
& \quad 13870UV + 3446U^2V - 1074U^3V - 177U^4V - 8084V^2 + 1742UV^2 + 601U^2V^2 - 669V^3 \} \\
& \{ \text{Knot} [10, 99], 0 \} \\
& \{ \text{Knot} [10, 100], -22108 + 23876U - 803U^2 - 5112U^3 + 363U^4 + 488U^5 + 3U^6 - 20U^7 - \\
& \quad 2U^8 - 23801V + 20259UV + 1817U^2V - 3450U^3V - 216U^4V + 188U^5V + 24U^6V - 9805V^2 + \\
& \quad 5804UV^2 + 1281U^2V^2 - 576U^3V^2 - 106U^4V^2 - 1829V^3 + 560UV^3 + 200U^2V^3 - 130V^4 \} \\
& \{ \text{Knot} [10, 101], \\
& \quad 131716 - 55956U - 14515U^2 + 4388U^3 + 777U^4 + 69751V - 14847UV - 5383U^2V + 9229V^2 \} \\
& \{ \text{Knot} [10, 102], 1708 - 852U - 351U^2 + 168U^3 + 26U^4 - 8U^5 - U^6 + \\
& \quad 1433V - 519UV - 208U^2V + 49U^3V + 10U^4V + 402V^2 - 79UV^2 - 33U^2V^2 + 37V^3 \} \\
& \{ \text{Knot} [10, 103], 17600 - 10364U - 2092U^2 + 1484U^3 + 170U^4 - 64U^5 - 9U^6 + \\
& \quad 14168V - 5527UV - 1696U^2V + 435U^3V + 90U^4V + 3784V^2 - 733UV^2 - 301U^2V^2 + 335V^3 \} \\
& \{ \text{Knot} [10, 104], 672 - 724U - 60U^2 + 140U^3 + 9U^4 - 8U^5 - U^6 + \\
& \quad 516V - 385UV - 87U^2V + 43U^3V + 8U^4V + 131V^2 - 51UV^2 - 19U^2V^2 + 11V^3 \} \\
& \{ \text{Knot} [10, 105], -13248 + 10188U - 534U^2 - 870U^3 + 54U^4 + 24U^5 + U^6 - \\
& \quad 7972V + 4178UV + 208U^2V - 202U^3V - 14U^4V - 1530V^2 + 409UV^2 + 63U^2V^2 - 91V^3 \}
\end{aligned}$$

$$\begin{aligned}
& \{ \text{Knot} [10, 106], -22308 + 15100U + 3537U^2 - 3508U^3 - 224U^4 + 302U^5 + 17U^6 - 10U^7 - \\
& \quad U^8 - 21511V + 11140UV + 3380U^2V - 1826U^3V - 260U^4V + 85U^5V + 12U^6V - 7772V^2 + \\
& \quad 2738UV^2 + 1036U^2V^2 - 239U^3V^2 - 53U^4V^2 - 1247V^3 + 224UV^3 + 103U^2V^3 - 75V^4 \} \\
& \{ \text{Knot} [10, 107], -300 + 274U - 69U^2 - 2U^3 + 2U^4 - 147V + 82UV - 8U^2V - U^3V - 18V^2 + 4UV^2 \} \\
& \{ \text{Knot} [10, 108], -15664 + 12044U + 602U^2 - 1644U^3 - 32U^4 + 72U^5 + 7U^6 - \\
& \quad 11348V + 5805UV + 1076U^2V - 469U^3V - 70U^4V - 2730V^2 + 699UV^2 + 223U^2V^2 - 217V^3 \} \\
& \{ \text{Knot} [10, 109], 0 \} \\
& \{ \text{Knot} [10, 110], 18524 - 12342U - 207U^2 + 1138U^3 - 30U^4 - 28U^5 - U^6 + \\
& \quad 10283V - 4624UV - 431U^2V + 218U^3V + 14U^4V + 1752V^2 - 401UV^2 - 61U^2V^2 + 83V^3 \} \\
& \{ \text{Knot} [10, 111], 46208 - 31224U - 3574U^2 + 4344U^3 + 206U^4 - 180U^5 - 17U^6 + 33336V - \\
& \quad 15108UV - 3320U^2V + 1166U^3V + 177U^4V + 7990V^2 - 1822UV^2 - 593U^2V^2 + 637V^3 \} \\
& \{ \text{Knot} [10, 112], 27080 - 26322U + 172U^2 + 5230U^3 - 386U^4 - 420U^5 + 8U^6 + 14U^7 + \\
& \quad U^8 + 26192V - 19240UV - 2018U^2V + 2868U^3V + 141U^4V - 129U^5V - 13U^6V + 9408V^2 - \\
& \quad 4634UV^2 - 1010U^2V^2 + 384U^3V^2 + 61U^4V^2 + 1486V^3 - 367UV^3 - 122U^2V^3 + 87V^4 \} \\
& \{ \text{Knot} [10, 113], -29604 + 22306U + 369U^2 - 2560U^3 - 6U^4 + 98U^5 + 9U^6 - 21977V + \\
& \quad 11005UV + 1604U^2V - 746U^3V - 102U^4V - 5526V^2 + 1371UV^2 + 383U^2V^2 - 471V^3 \} \\
& \{ \text{Knot} [10, 114], -2548 + 1704U + 261U^2 - 272U^3 - 13U^4 + 12U^5 + U^6 - \\
& \quad 2115V + 974UV + 216U^2V - 80U^3V - 11U^4V - 553V^2 + 132UV^2 + 39U^2V^2 - 45V^3 \} \\
& \{ \text{Knot} [10, 115], 0 \} \\
& \{ \text{Knot} [10, 116], 24352 - 21596U - 912U^2 + 4342U^3 - 150U^4 - 356U^5 - 3U^6 + 12U^7 + \\
& \quad U^8 + 24628V - 16688UV - 2386U^2V + 2507U^3V + 183U^4V - 114U^5V - 13U^6V + 9280V^2 - \\
& \quad 4263UV^2 - 1056U^2V^2 + 356U^3V^2 + 62U^4V^2 + 1541V^3 - 359UV^3 - 128U^2V^3 + 95V^4 \} \\
& \{ \text{Knot} [10, 117], -20468 + 14222U + 1073U^2 - 1728U^3 - 103U^4 + 72U^5 + 9U^6 - \\
& \quad 17097V + 7754UV + 1626U^2V - 554U^3V - 98U^4V - 4781V^2 + 1061UV^2 + 361U^2V^2 - 447V^3 \} \\
& \{ \text{Knot} [10, 118], 0 \} \\
& \{ \text{Knot} [10, 119], 736 - 354U - 276U^2 + 128U^3 + 23U^4 - 8U^5 - U^6 + \\
& \quad 958V - 370UV - 185U^2V + 48U^3V + 10U^4V + 349V^2 - 75UV^2 - 33U^2V^2 + 37V^3 \} \\
& \{ \text{Knot} [10, 120], \\
& \quad -201652 + 88812U + 20233U^2 - 6620U^3 - 1112U^4 - 107419V + 23668UV + 7982U^2V - 14302V^2 \} \\
& \{ \text{Knot} [10, 121], 26456 - 19296U - 570U^2 + 2158U^3 + 52U^4 - 84U^5 - 9U^6 + 20762V - \\
& \quad 9944UV - 1637U^2V + 665U^3V + 102U^4V + 5514V^2 - 1295UV^2 - 389U^2V^2 + 495V^3 \} \\
& \{ \text{Knot} [10, 122], 1768 - 1236U - 322U^2 + 262U^3 + 17U^4 - 12U^5 - U^6 + \\
& \quad 2042V - 927UV - 240U^2V + 80U^3V + 11U^4V + 589V^2 - 132UV^2 - 39U^2V^2 + 45V^3 \} \\
& \{ \text{Knot} [10, 123], 0 \} \\
& \{ \text{Knot} [10, 124], -76704 + 18278U + 32916U^2 - 1800U^3 - 5258U^4 - 530U^5 + 268U^6 + \\
& \quad 64U^7 + 4U^8 - 59990V - 942UV + 19696U^2V + 3292U^3V - 1500U^4V - 472U^5V - 36U^6V - \\
& \quad 15564V^2 - 4269UV^2 + 2536U^2V^2 + 1072U^3V^2 + 104U^4V^2 - 1324V^3 - 724UV^3 - 96U^2V^3 + 4V^4 \} \\
& \{ \text{Knot} [10, 125], 96 + 724U - 164U^2 - 152U^3 + 7U^4 + 10U^5 + U^6 - \\
& \quad 116V + 477UV + 18U^2V - 57U^3V - 8U^4V - 79V^2 + 75UV^2 + 19U^2V^2 - 11V^3 \} \\
& \{ \text{Knot} [10, 126], 812 - 350U - 185U^2 + 88U^3 + 17U^4 - 6U^5 - U^6 + \\
& \quad 711V - 227UV - 123U^2V + 29U^3V + 8U^4V + 203V^2 - 35UV^2 - 21U^2V^2 + 19V^3 \}
\end{aligned}$$

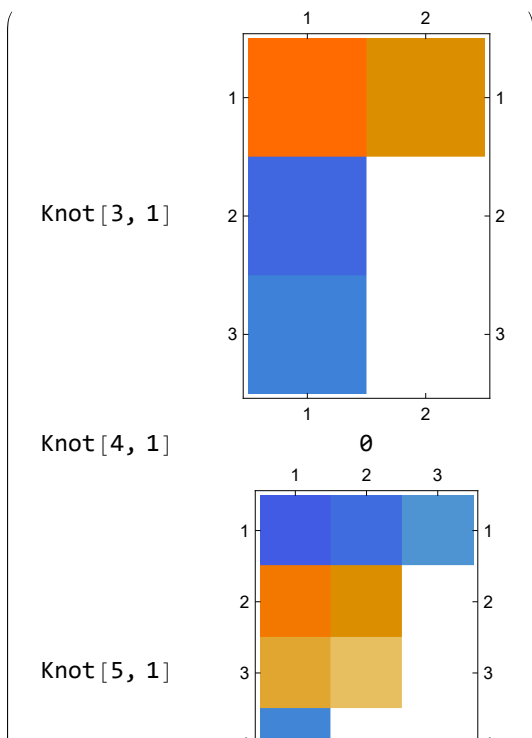
$$\begin{aligned}
& \{ \text{Knot} [10, 127], -5244 + 4004 U + 291 U^2 - 568 U^3 - 14 U^4 + 24 U^5 + 2 U^6 - \\
& \quad 3577 V + 1824 UV + 345 U^2 V - 145 U^3 V - 20 U^4 V - 798 V^2 + 203 UV^2 + 62 U^2 V^2 - 58 V^3 \} \\
& \{ \text{Knot} [10, 128], 30468 + 12882 U - 10109 U^2 - 3634 U^3 + 576 U^4 + 294 U^5 + 25 U^6 + 14253 V + \\
& \quad 11199 UV - 1707 U^2 V - 1618 U^3 V - 187 U^4 V + 1126 V^2 + 2066 UV^2 + 385 U^2 V^2 - 135 V^3 \} \\
& \{ \text{Knot} [10, 129], 444 - 130 U - 41 U^2 + 6 U^3 + U^4 + 155 V - 18 UV - 6 U^2 V + 9 V^2 \} \\
& \{ \text{Knot} [10, 130], 360 - 62 U - 18 U^2 - 4 U^3 - U^4 + 64 V + 12 UV + 6 U^2 V - 9 V^2 \} \\
& \{ \text{Knot} [10, 131], 2920 - 1278 U - 218 U^2 + 82 U^3 + 9 U^4 + 1304 V - 294 UV - 72 U^2 V + 139 V^2 \} \\
& \{ \text{Knot} [10, 132], 172 - 10 U - 19 U^2 - 2 U^3 + 47 V + 7 UV \} \\
& \{ \text{Knot} [10, 133], 736 - 306 U - 42 U^2 + 16 U^3 + U^4 + 270 V - 58 UV - 9 U^2 V + 19 V^2 \} \\
& \{ \text{Knot} [10, 134], 836 + 18396 U - 3841 U^2 - 3840 U^3 + 166 U^4 + 252 U^5 + 25 U^6 - 3501 V + \\
& \quad 11645 UV + 534 U^2 V - 1396 U^3 V - 199 U^4 V - 2040 V^2 + 1796 UV^2 + 469 U^2 V^2 - 279 V^3 \} \\
& \{ \text{Knot} [10, 135], -276 + 136 U + 43 U^2 - 14 U^3 - 3 U^4 - 211 V + 50 UV + 21 U^2 V - 37 V^2 \} \\
& \{ \text{Knot} [10, 136], -220 + 136 U + 11 U^2 - 10 U^3 - U^4 - 109 V + 35 UV + 8 U^2 V - 15 V^2 \} \\
& \{ \text{Knot} [10, 137], -232 + 122 U - 8 U^2 - 2 U^3 - 40 V + 10 UV \} \\
& \{ \text{Knot} [10, 138], -3400 + 3420 U - 264 U^2 - 402 U^3 + 25 U^4 + 16 U^5 + U^6 - \\
& \quad 2162 V + 1445 UV + 118 U^2 V - 108 U^3 V - 11 U^4 V - 471 V^2 + 156 UV^2 + 37 U^2 V^2 - 35 V^3 \} \\
& \{ \text{Knot} [10, 139], -113980 + 19452 U + 41953 U^2 - 856 U^3 - 5823 U^4 - 662 U^5 + 260 U^6 + 64 U^7 + \\
& \quad 4 U^8 - 89153 V - 2895 UV + 24090 U^2 V + 3998 U^3 V - 1564 U^4 V - 484 U^5 V - 36 U^6 V - 23405 V^2 - \\
& \quad 5410 UV^2 + 3068 U^2 V^2 + 1160 U^3 V^2 + 104 U^4 V^2 - 2108 V^3 - 868 UV^3 - 92 U^2 V^3 - 12 V^4 \} \\
& \{ \text{Knot} [10, 140], 144 - 28 U - 12 U^2 + 40 V \} \\
& \{ \text{Knot} [10, 141], 324 - 140 U - 27 U^2 + 10 U^3 + U^4 + 143 V - 33 UV - 8 U^2 V + 15 V^2 \} \\
& \{ \text{Knot} [10, 142], 15380 + 15096 U - 6683 U^2 - 3678 U^3 + 350 U^4 + 270 U^5 + 25 U^6 + 5495 V + \\
& \quad 10806 UV - 560 U^2 V - 1444 U^3 V - 187 U^4 V - 316 V^2 + 1802 UV^2 + 397 U^2 V^2 - 183 V^3 \} \\
& \{ \text{Knot} [10, 143], 700 - 466 U - 143 U^2 + 100 U^3 + 16 U^4 - 6 U^5 - U^6 + \\
& \quad 759 V - 328 UV - 132 U^2 V + 36 U^3 V + 9 U^4 V + 254 V^2 - 54 UV^2 - 27 U^2 V^2 + 27 V^3 \} \\
& \{ \text{Knot} [10, 144], 6248 - 2752 U - 606 U^2 + 208 U^3 + 30 U^4 + 3062 V - 684 UV - 216 U^2 V + 374 V^2 \} \\
& \{ \text{Knot} [10, 145], 1040 + 92 U - 122 U^2 - 30 U^3 - 2 U^4 + 296 V + 82 UV + 6 U^2 V + 6 V^2 \} \\
& \{ \text{Knot} [10, 146], -208 + 158 U - 4 U^2 - 8 U^3 - U^4 - 130 V + 43 UV + 9 U^2 V - 21 V^2 \} \\
& \{ \text{Knot} [10, 147], -1520 + 678 U + 140 U^2 - 50 U^3 - 7 U^4 - 730 V + 165 UV + 51 U^2 V - 89 V^2 \} \\
& \{ \text{Knot} [10, 148], 420 - 28 U - 209 U^2 + 44 U^3 + 23 U^4 - 4 U^5 - U^6 + \\
& \quad 663 V - 151 UV - 147 U^2 V + 23 U^3 V + 9 U^4 V + 263 V^2 - 38 UV^2 - 28 U^2 V^2 + 31 V^3 \} \\
& \{ \text{Knot} [10, 149], -9256 + 6076 U + 618 U^2 - 776 U^3 - 23 U^4 + 28 U^5 + 2 U^6 - \\
& \quad 6002 V + 2627 UV + 510 U^2 V - 180 U^3 V - 22 U^4 V - 1249 V^2 + 273 UV^2 + 76 U^2 V^2 - 82 V^3 \} \\
& \{ \text{Knot} [10, 150], 4484 - 3702 U - 161 U^2 + 536 U^3 + 6 U^4 - 24 U^5 - 2 U^6 + \\
& \quad 3157 V - 1751 UV - 299 U^2 V + 146 U^3 V + 20 U^4 V + 740 V^2 - 206 UV^2 - 62 U^2 V^2 + 58 V^3 \} \\
& \{ \text{Knot} [10, 151], -1600 + 644 U + 292 U^2 - 88 U^3 - 28 U^4 + 4 U^5 + U^6 - \\
& \quad 1472 V + 419 UV + 203 U^2 V - 31 U^3 V - 10 U^4 V - 440 V^2 + 65 UV^2 + 35 U^2 V^2 - 43 V^3 \} \\
& \{ \text{Knot} [10, 152], 166900 - 47634 U - 55435 U^2 + 6188 U^3 + 7632 U^4 + 440 U^5 - 365 U^6 - 72 U^7 - 4 U^8 + \\
& \quad 133609 V - 9978 UV - 34200 U^2 V - 3137 U^3 V + 2346 U^4 V + 560 U^5 V + 36 U^6 V + 36248 V^2 + \\
& \quad 4587 UV^2 - 4893 U^2 V^2 - 1368 U^3 V^2 - 100 U^4 V^2 + 3495 V^3 + 1028 UV^3 + 68 U^2 V^3 + 44 V^4 \}
\end{aligned}$$

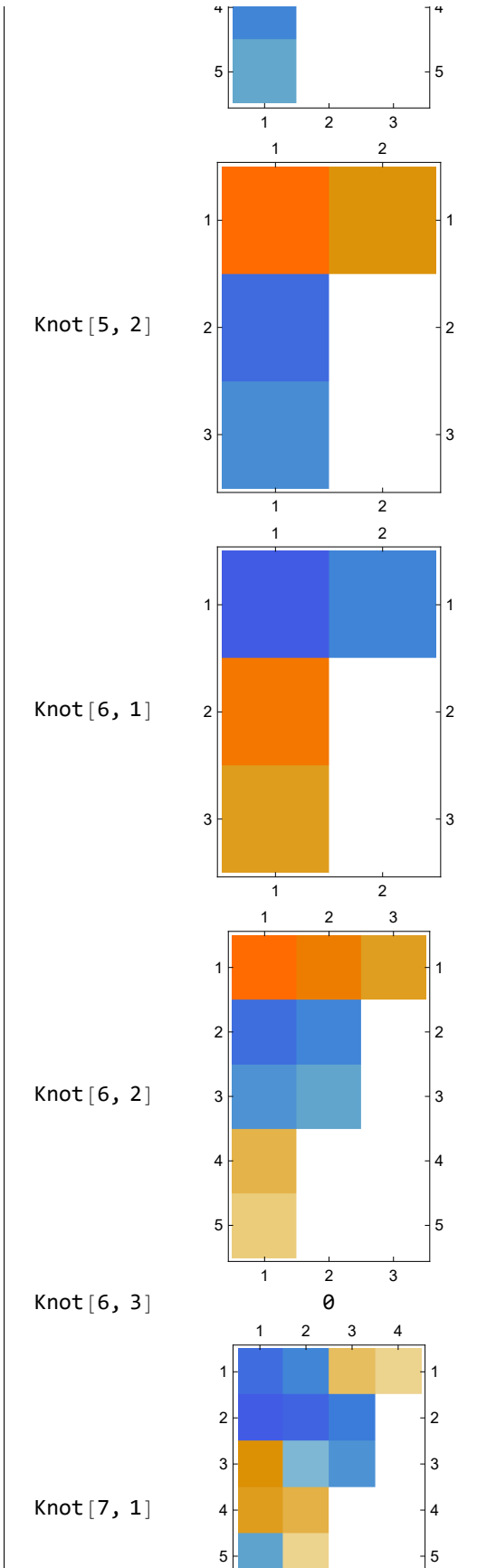


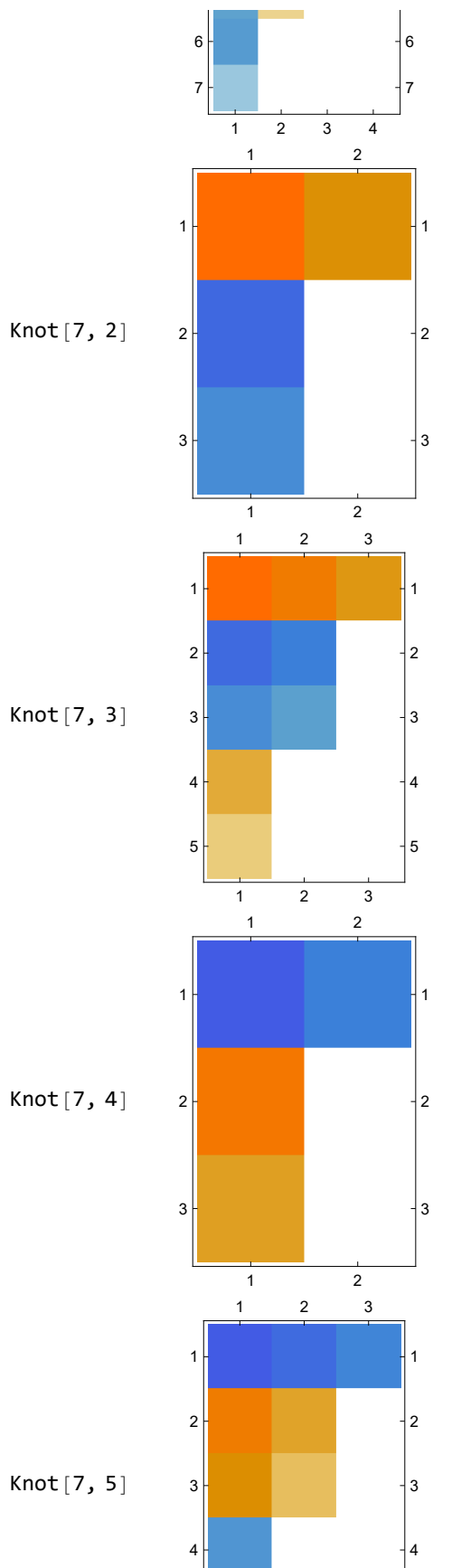
- { Knot [10, 153], -1892 - 250 U + 511 U<sup>2</sup> + 122 U<sup>3</sup> - 30 U<sup>4</sup> - 12 U<sup>5</sup> - U<sup>6</sup> - 1045 V - 373 U V + 123 U<sup>2</sup> V + 66 U<sup>3</sup> V + 7 U<sup>4</sup> V - 148 V<sup>2</sup> - 83 U V<sup>2</sup> - 12 U<sup>2</sup> V<sup>2</sup> - V<sup>3</sup> }
- { Knot [10, 154], 25 844 - 3666 U - 5447 U<sup>2</sup> - 160 U<sup>3</sup> + 340 U<sup>4</sup> + 60 U<sup>5</sup> + 3 U<sup>6</sup> + 14 385 V + 776 U V - 1696 U<sup>2</sup> V - 345 U<sup>3</sup> V - 18 U<sup>4</sup> V + 2144 V<sup>2</sup> + 471 U V<sup>2</sup> + 15 U<sup>2</sup> V<sup>2</sup> + 39 V<sup>3</sup> }
- { Knot [10, 155], -536 + 238 U + 48 U<sup>2</sup> - 18 U<sup>3</sup> - 2 U<sup>4</sup> - 256 V + 60 U V + 16 U<sup>2</sup> V - 30 V<sup>2</sup> }
- { Knot [10, 156], 1820 - 1310 U - 111 U<sup>2</sup> + 178 U<sup>3</sup> + 10 U<sup>4</sup> - 8 U<sup>5</sup> - U<sup>6</sup> + 1479 V - 683 U V - 160 U<sup>2</sup> V + 55 U<sup>3</sup> V + 10 U<sup>4</sup> V + 398 V<sup>2</sup> - 89 U V<sup>2</sup> - 33 U<sup>2</sup> V<sup>2</sup> + 35 V<sup>3</sup> }
- { Knot [10, 157], 16 848 - 11 158 U - 868 U<sup>2</sup> + 1302 U<sup>3</sup> + 14 U<sup>4</sup> - 40 U<sup>5</sup> - 2 U<sup>6</sup> + 10 138 V - 4406 U V - 722 U<sup>2</sup> V + 262 U<sup>3</sup> V + 24 U<sup>4</sup> V + 1872 V<sup>2</sup> - 395 U V<sup>2</sup> - 88 U<sup>2</sup> V<sup>2</sup> + 98 V<sup>3</sup> }
- { Knot [10, 158], 380 - 138 U - 43 U<sup>2</sup> + 10 U<sup>3</sup> + 2 U<sup>4</sup> + 155 V - 25 U V - 12 U<sup>2</sup> V + 16 V<sup>2</sup> }
- { Knot [10, 159], 276 - 412 U - 23 U<sup>2</sup> + 88 U<sup>3</sup> + 9 U<sup>4</sup> - 6 U<sup>5</sup> - U<sup>6</sup> + 675 V - 395 U V - 115 U<sup>2</sup> V + 43 U<sup>3</sup> V + 10 U<sup>4</sup> V + 307 V<sup>2</sup> - 77 U V<sup>2</sup> - 34 U<sup>2</sup> V<sup>2</sup> + 39 V<sup>3</sup> }
- { Knot [10, 160], 1640 - 4196 U + 782 U<sup>2</sup> + 626 U<sup>3</sup> - 56 U<sup>4</sup> - 32 U<sup>5</sup> - 2 U<sup>6</sup> + 1630 V - 2109 U V - 66 U<sup>2</sup> V + 194 U<sup>3</sup> V + 20 U<sup>4</sup> V + 474 V<sup>2</sup> - 254 U V<sup>2</sup> - 58 U<sup>2</sup> V<sup>2</sup> + 42 V<sup>3</sup> }
- { Knot [10, 161], -13 480 + 744 U + 3222 U<sup>2</sup> + 310 U<sup>3</sup> - 204 U<sup>4</sup> - 48 U<sup>5</sup> - 3 U<sup>6</sup> - 7262 V - 980 U V + 900 U<sup>2</sup> V + 250 U<sup>3</sup> V + 18 U<sup>4</sup> V - 1034 V<sup>2</sup> - 307 U V<sup>2</sup> - 21 U<sup>2</sup> V<sup>2</sup> - 15 V<sup>3</sup> }
- { Knot [10, 162], 5856 - 2496 U - 616 U<sup>2</sup> + 196 U<sup>3</sup> + 30 U<sup>4</sup> + 2812 V - 603 U V - 207 U<sup>2</sup> V + 338 V<sup>2</sup> }
- { Knot [10, 163], -2712 + 1870 U + 98 U<sup>2</sup> - 208 U<sup>3</sup> - 9 U<sup>4</sup> + 8 U<sup>5</sup> + U<sup>6</sup> - 2156 V + 962 U V + 186 U<sup>2</sup> V - 64 U<sup>3</sup> V - 11 U<sup>4</sup> V - 575 V<sup>2</sup> + 124 U V<sup>2</sup> + 41 U<sup>2</sup> V<sup>2</sup> - 51 V<sup>3</sup> }
- { Knot [10, 164], -416 + 286 U + 20 U<sup>2</sup> - 20 U<sup>3</sup> - 3 U<sup>4</sup> - 290 V + 88 U V + 24 U<sup>2</sup> V - 49 V<sup>2</sup> }
- { Knot [10, 165], -5044 + 2334 U + 233 U<sup>2</sup> - 120 U<sup>3</sup> - 9 U<sup>4</sup> - 1993 V + 472 U V + 80 U<sup>2</sup> V - 171 V<sup>2</sup> }

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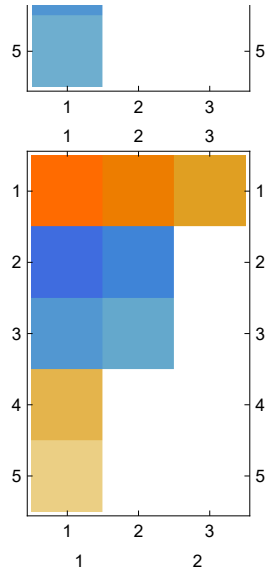
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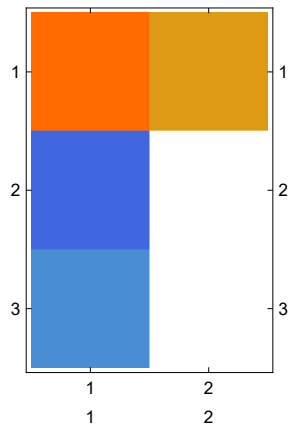




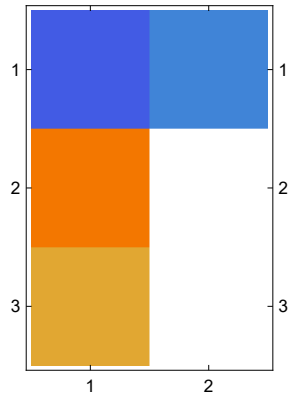
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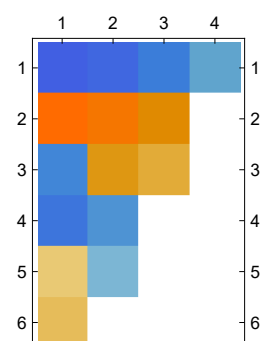
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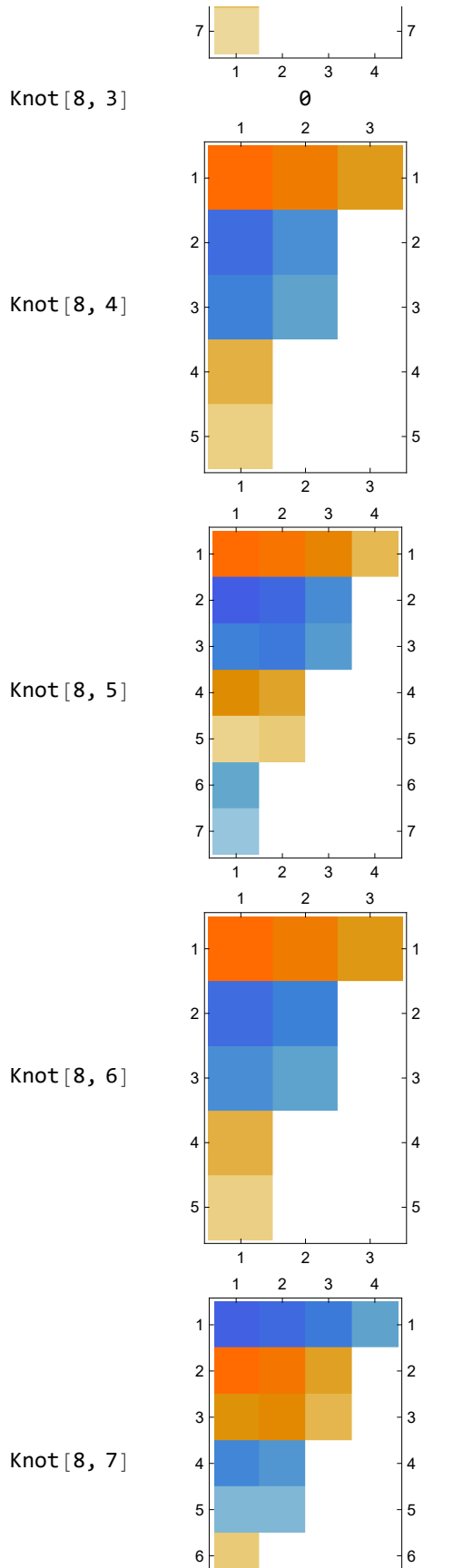


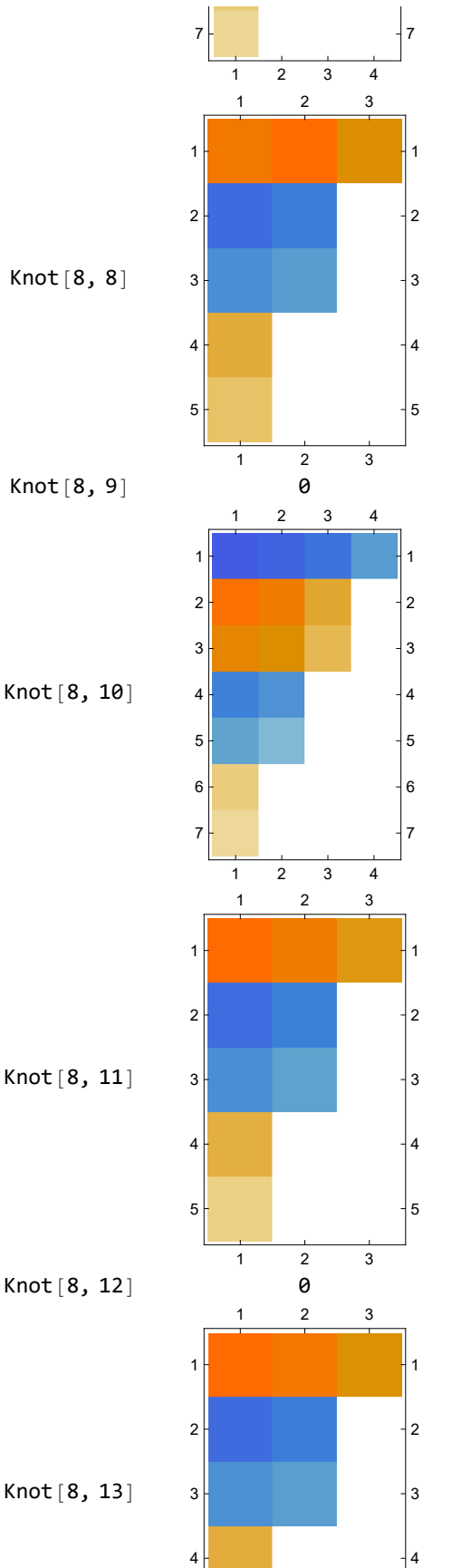
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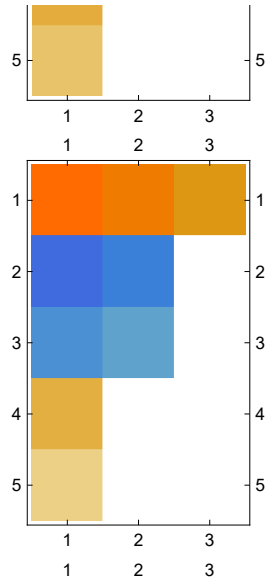
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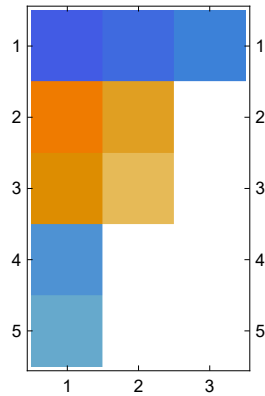




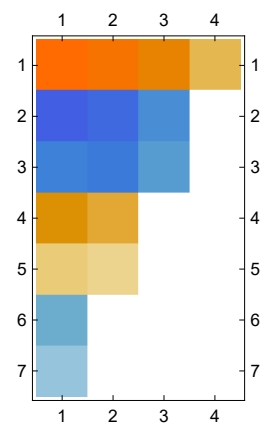
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Knot [8, 15]



Knot [8, 16]



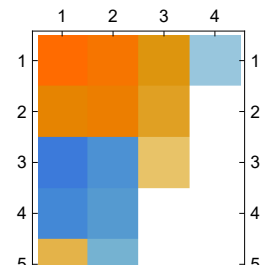
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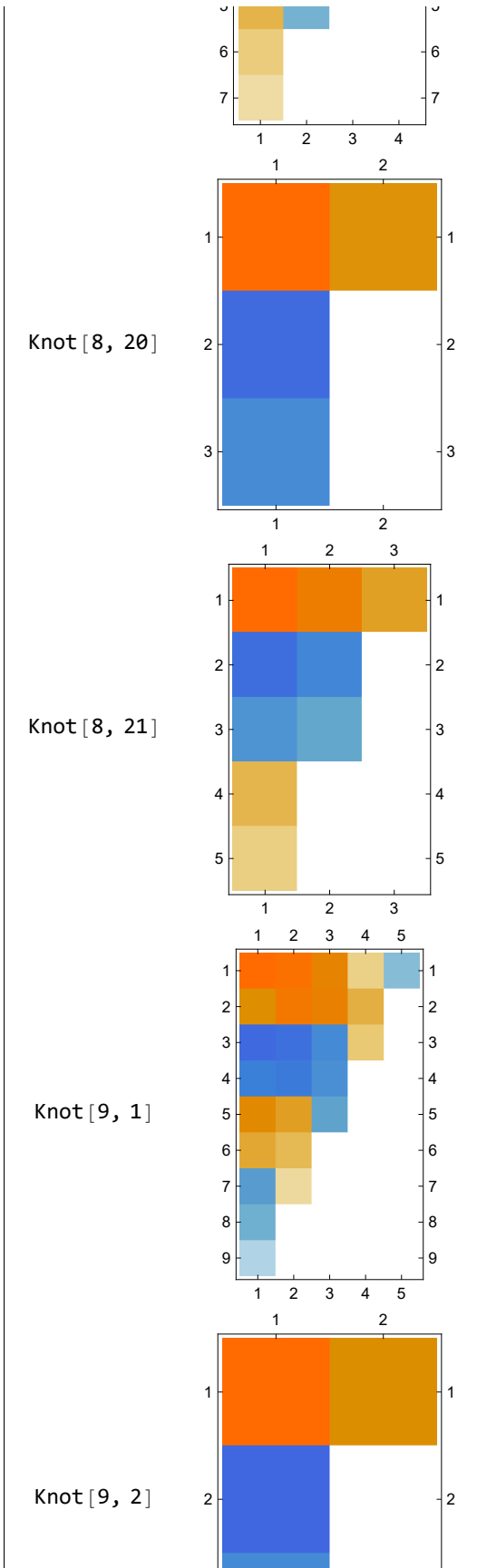
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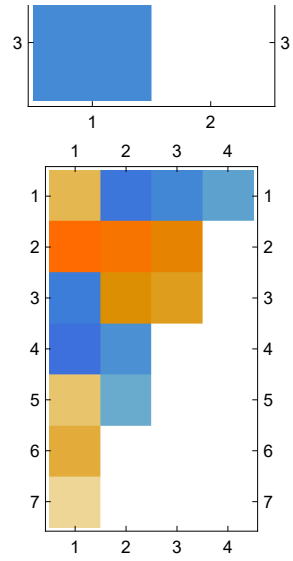
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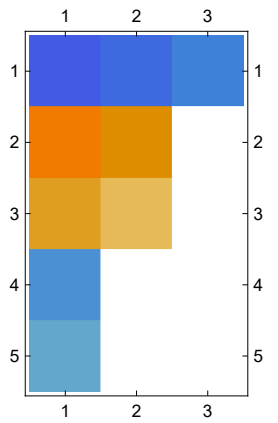




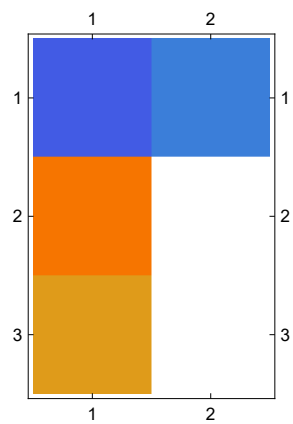
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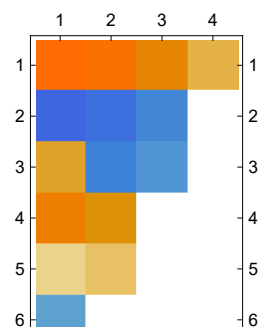
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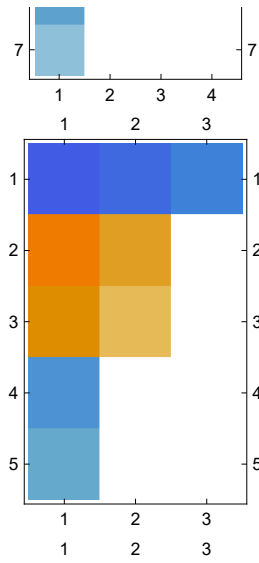
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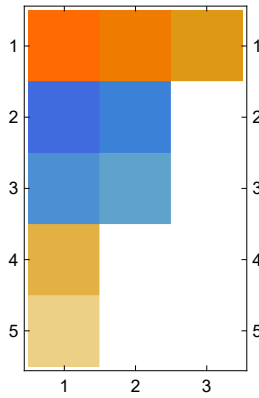
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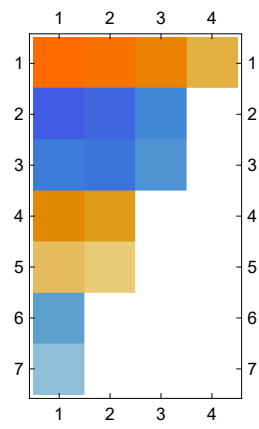
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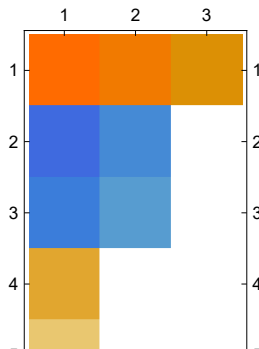
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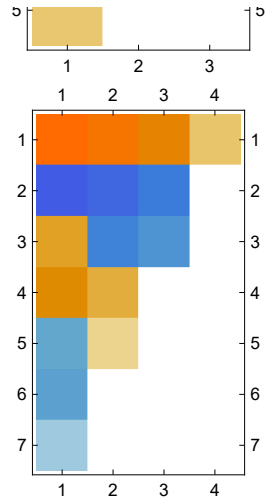
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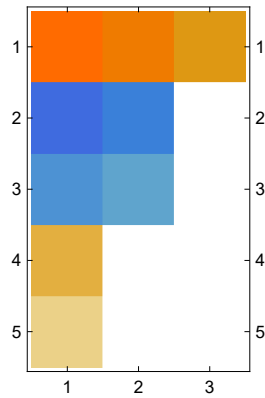
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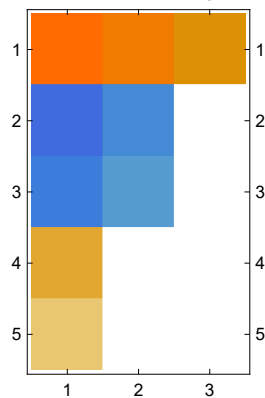
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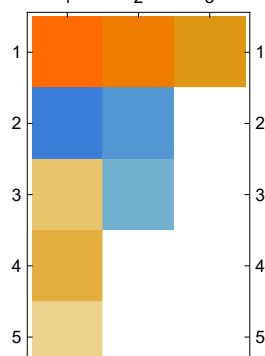
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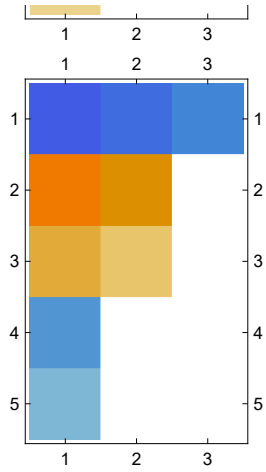
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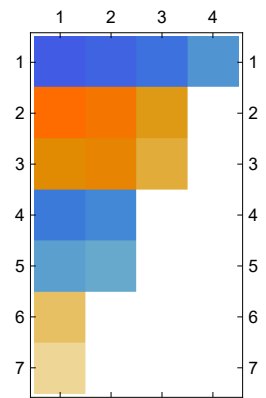
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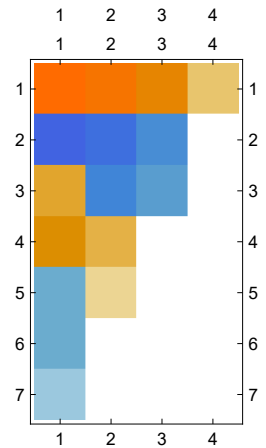
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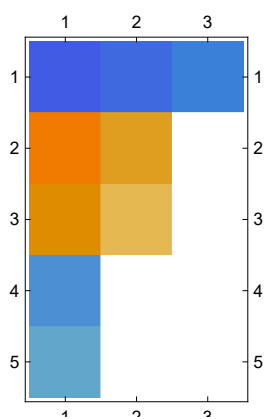
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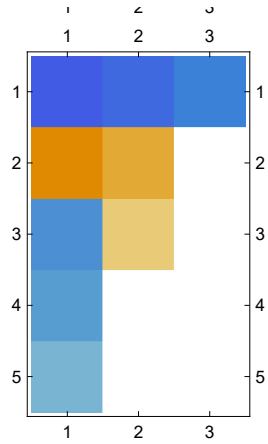
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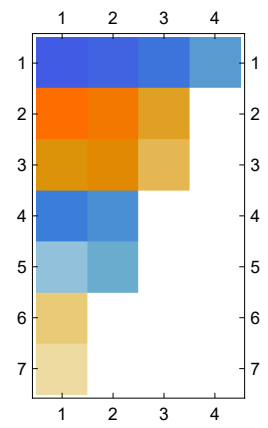
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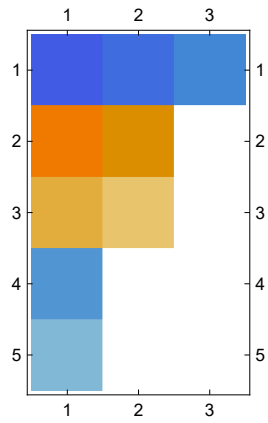
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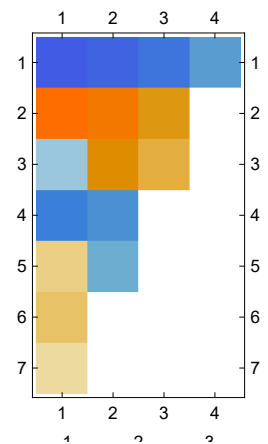
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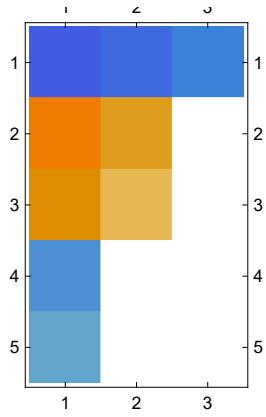
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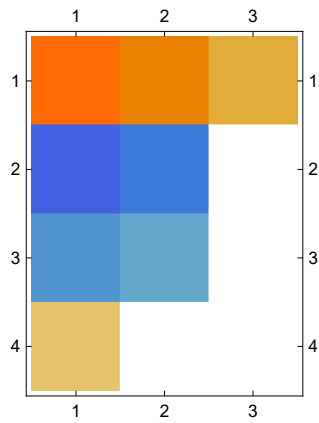
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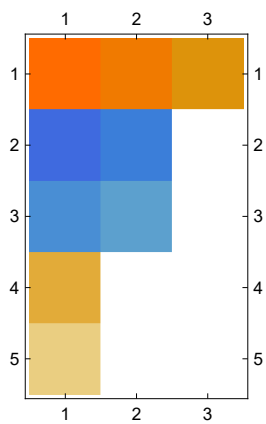
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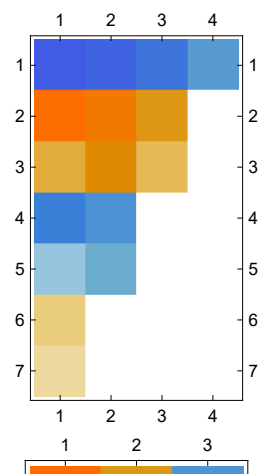
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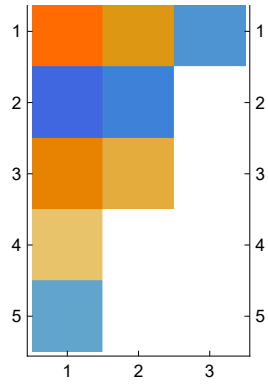
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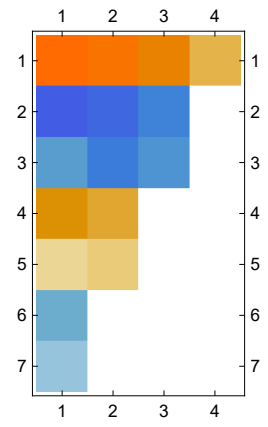
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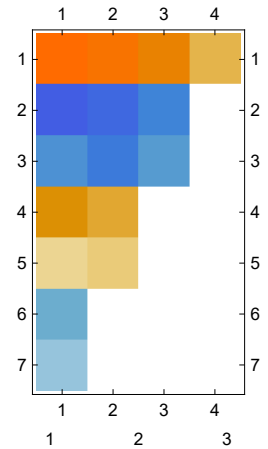
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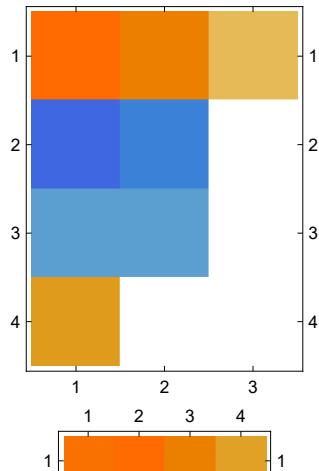
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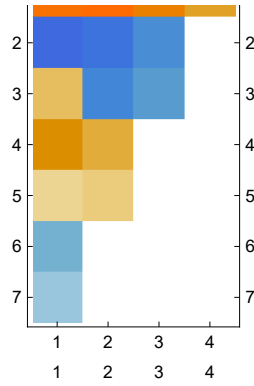
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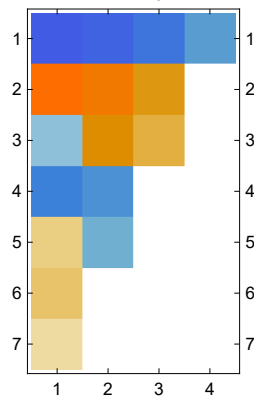
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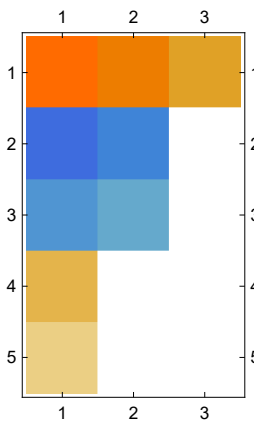
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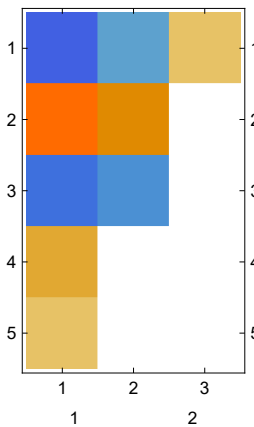
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Knot [9, 33]

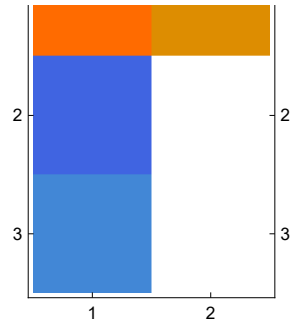


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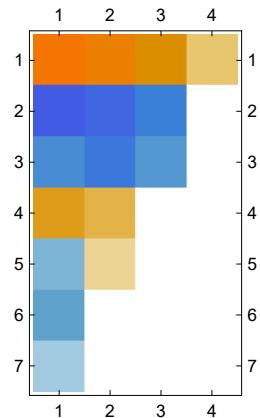




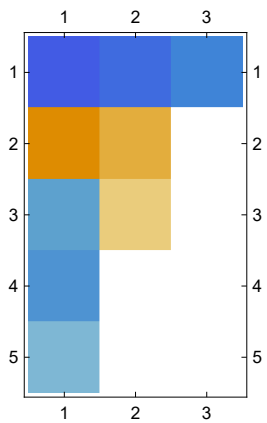
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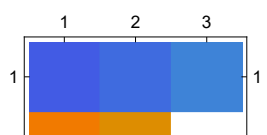
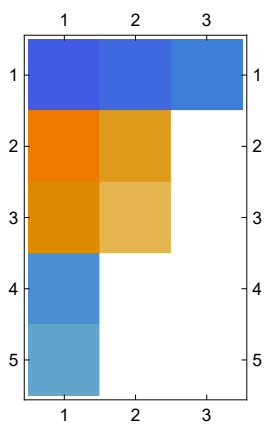
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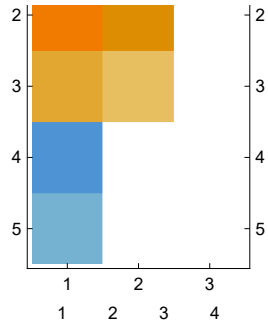
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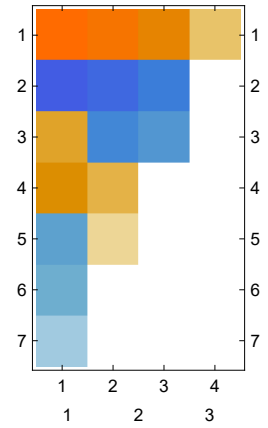
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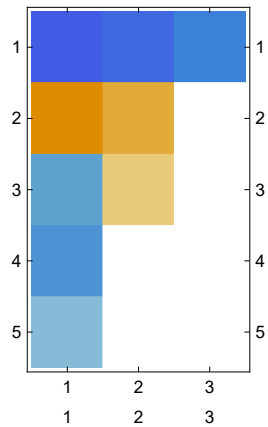
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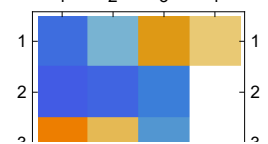
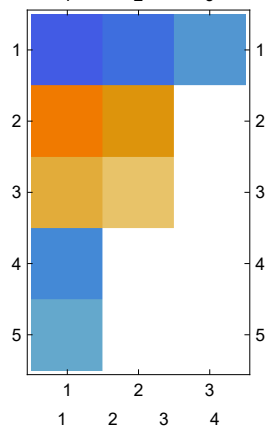
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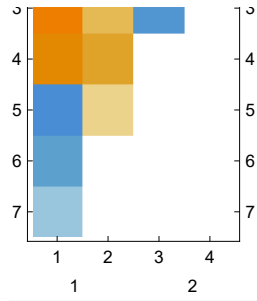
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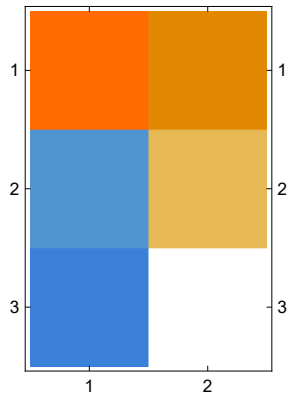
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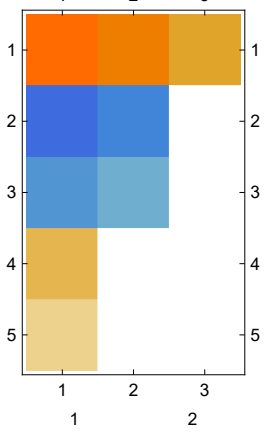
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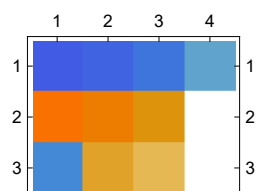
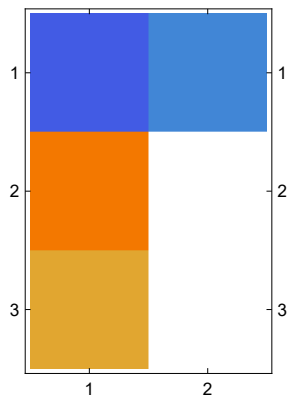
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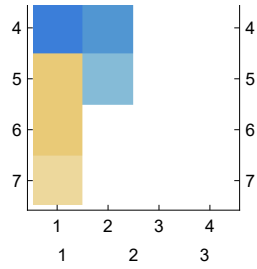
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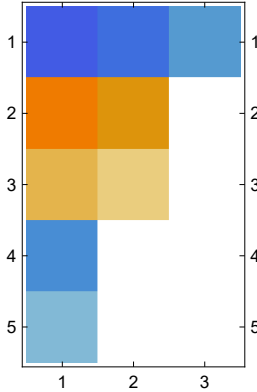
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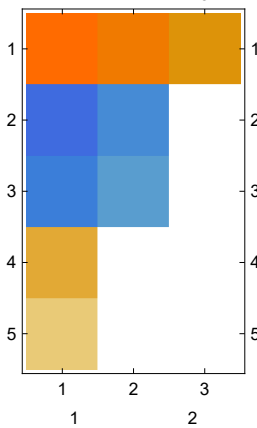
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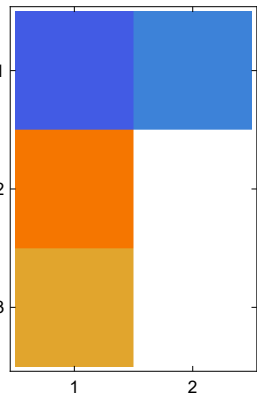
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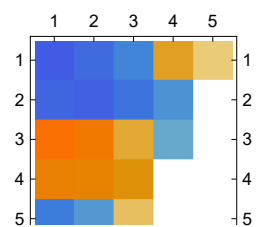
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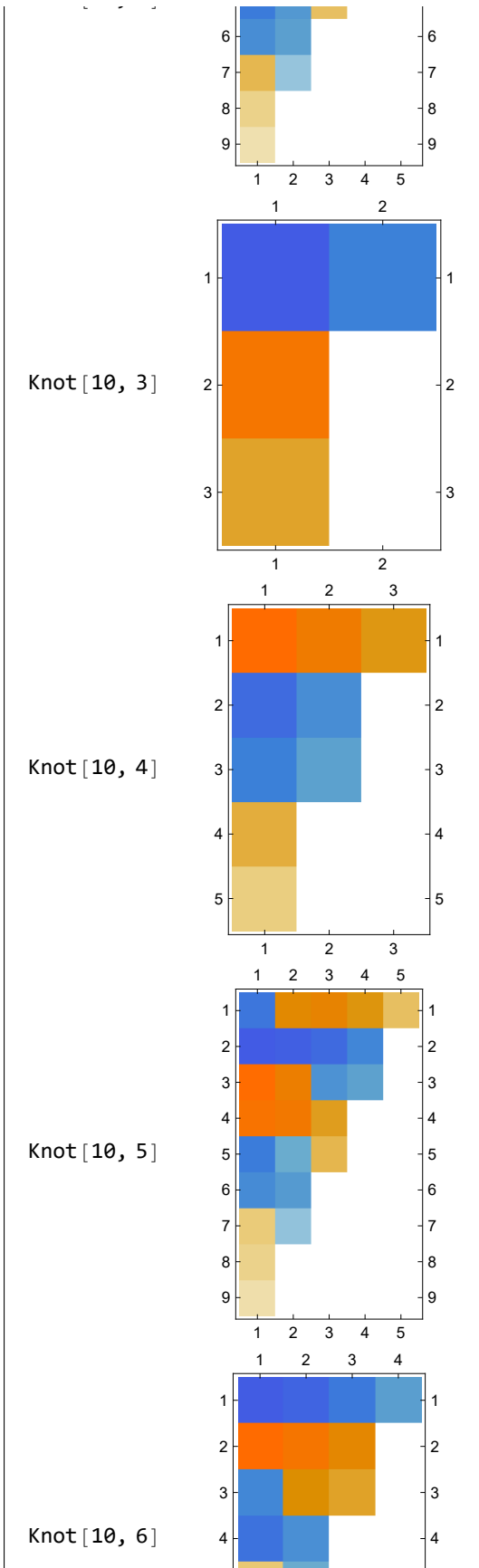


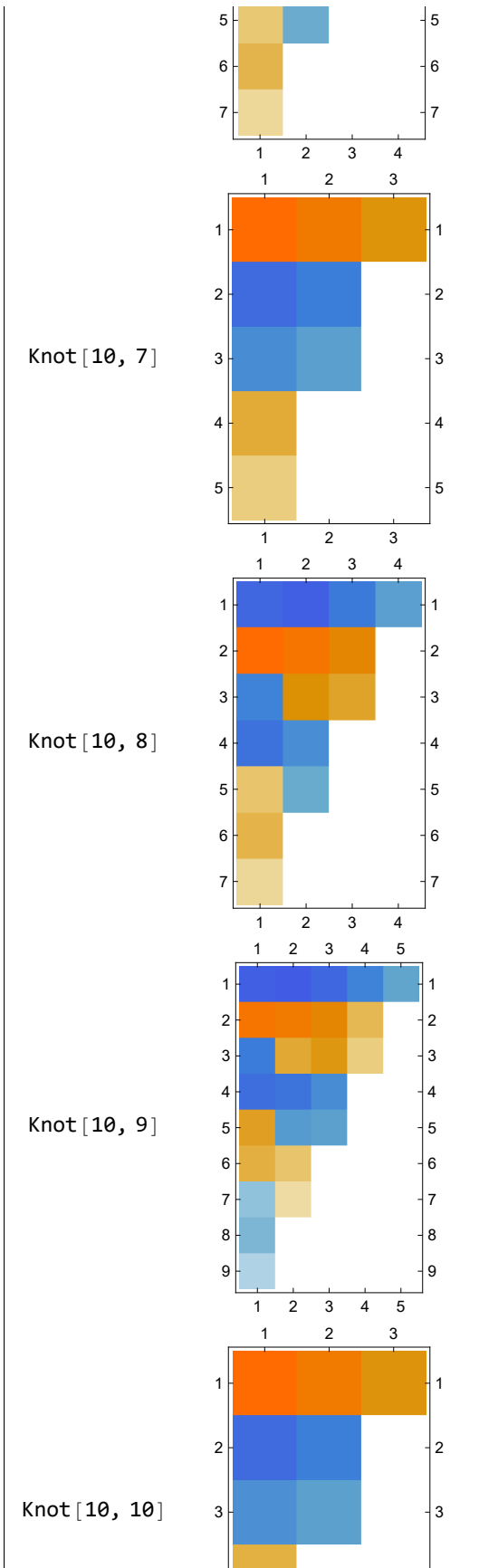
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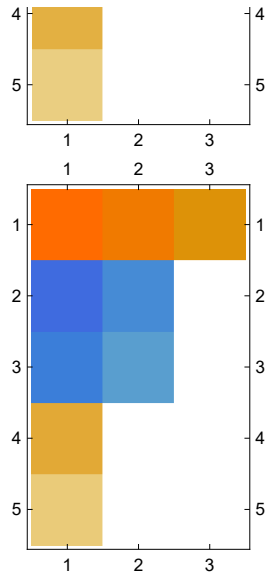
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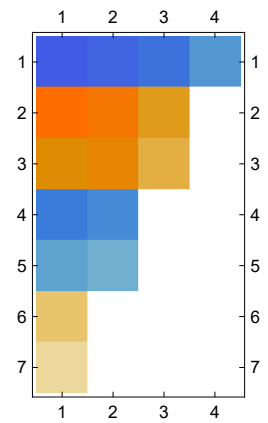




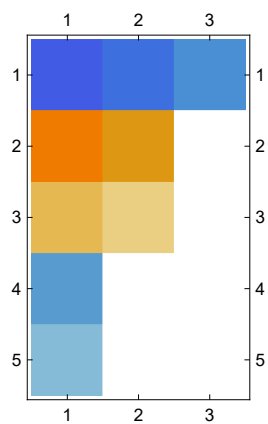
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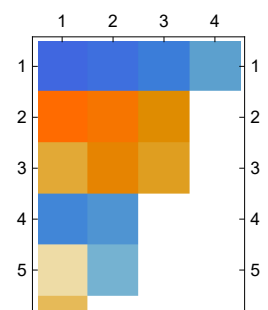
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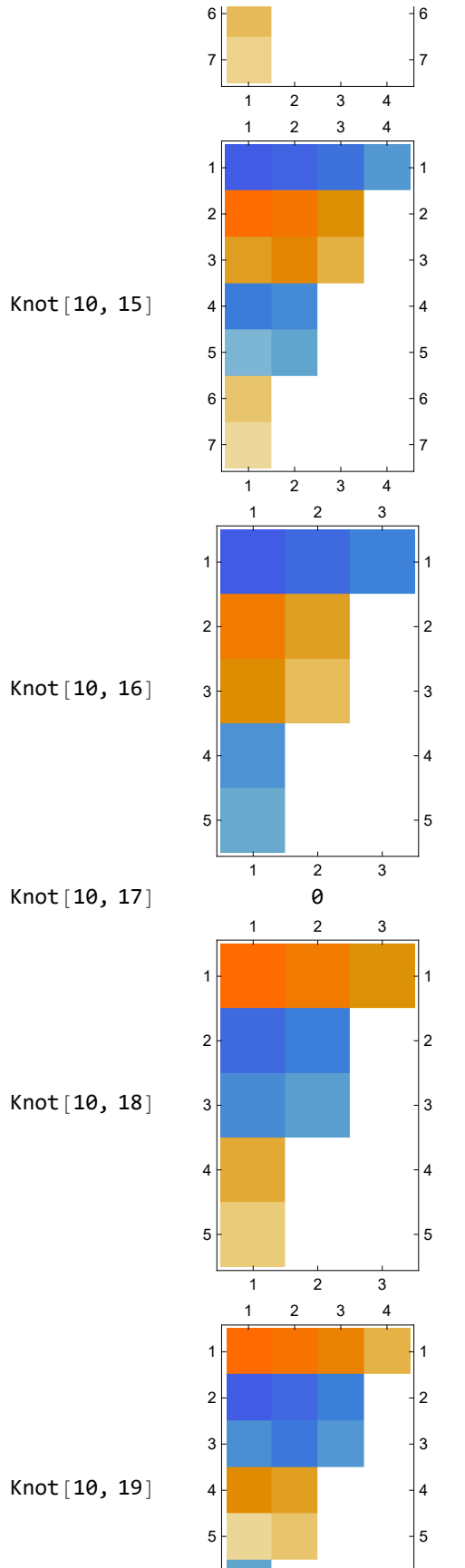


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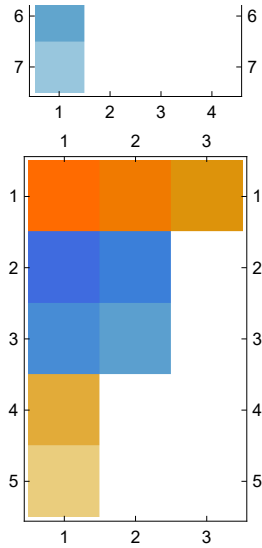
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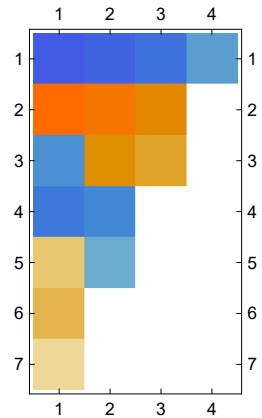




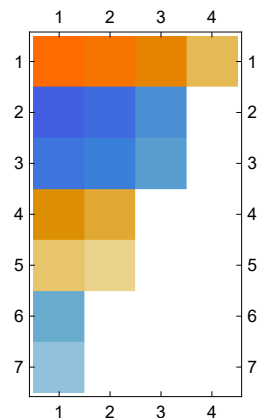
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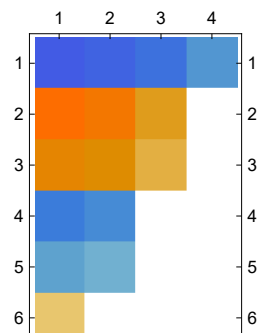
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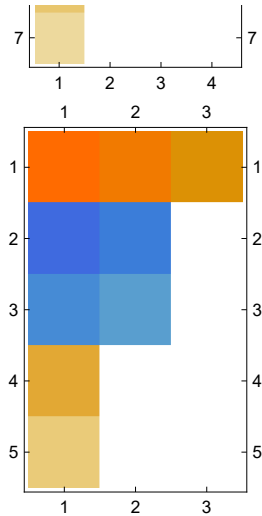
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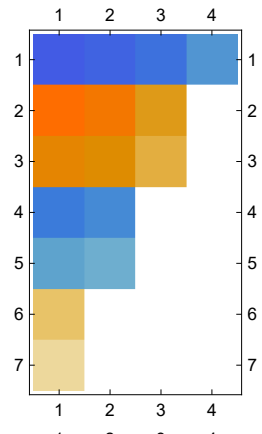
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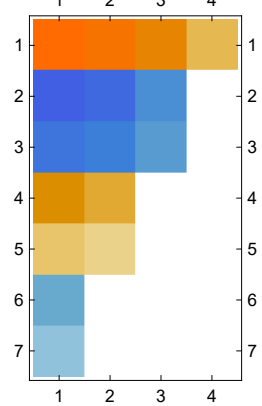
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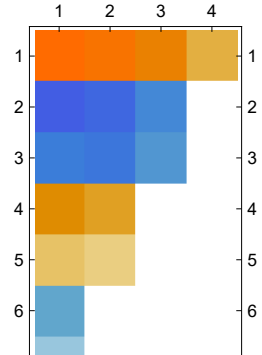
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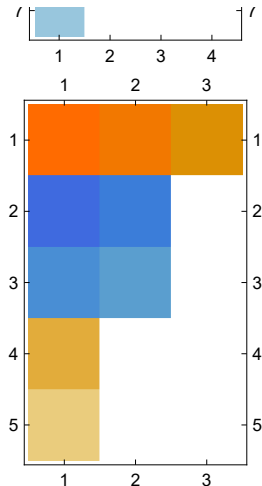
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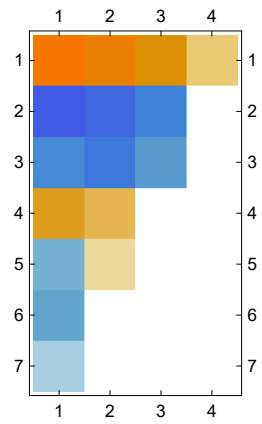
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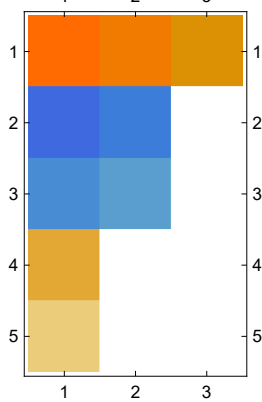
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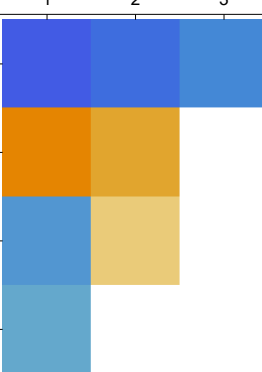
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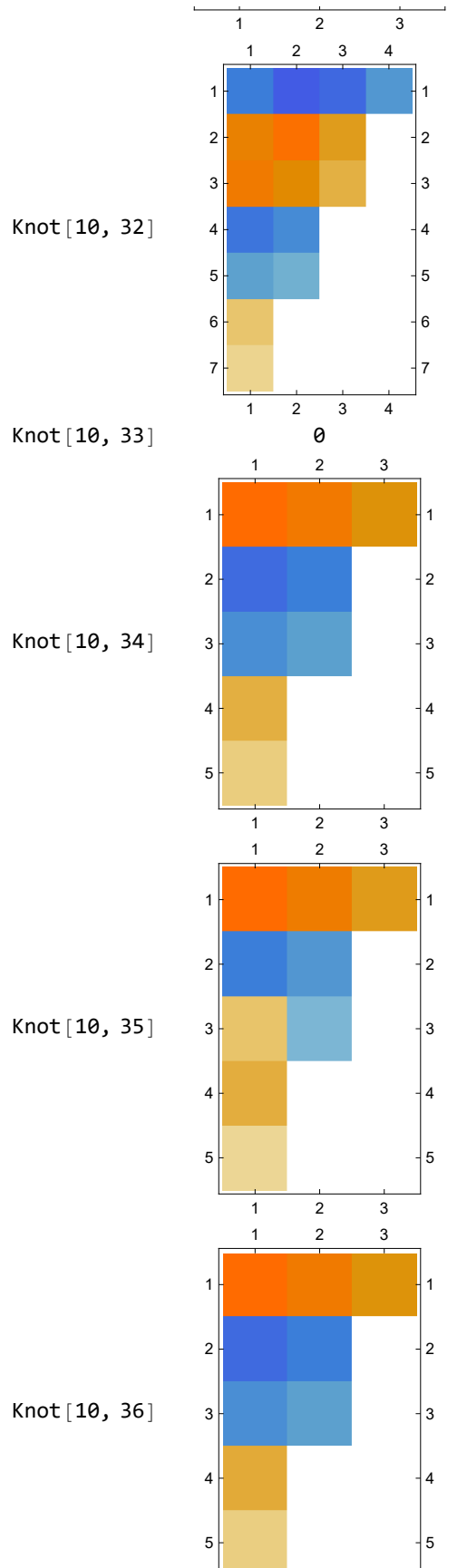


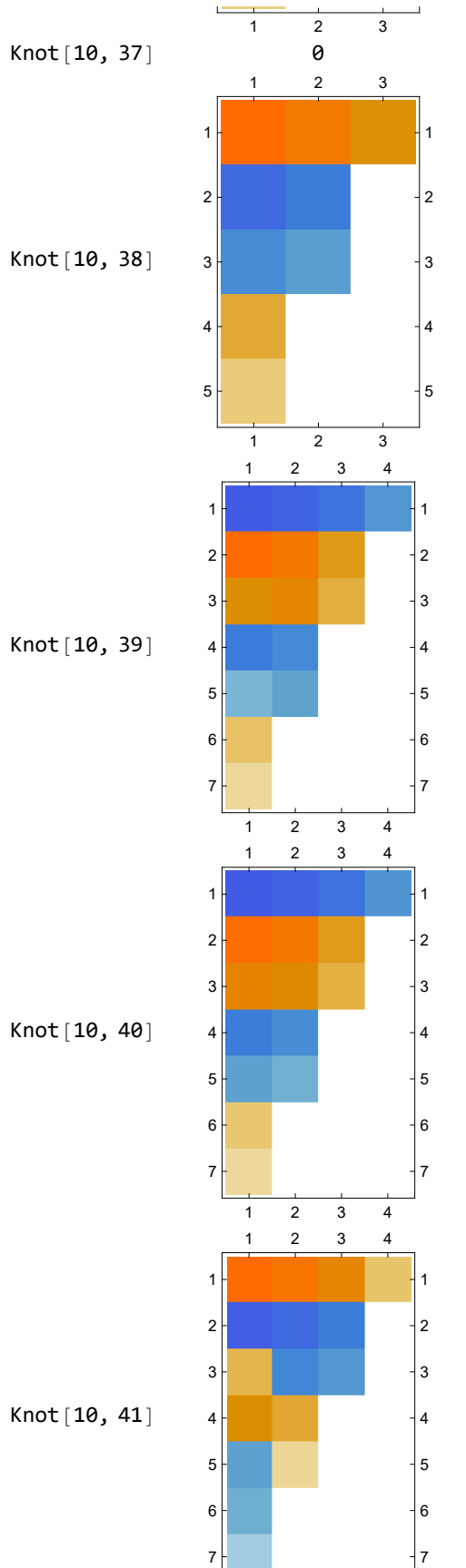
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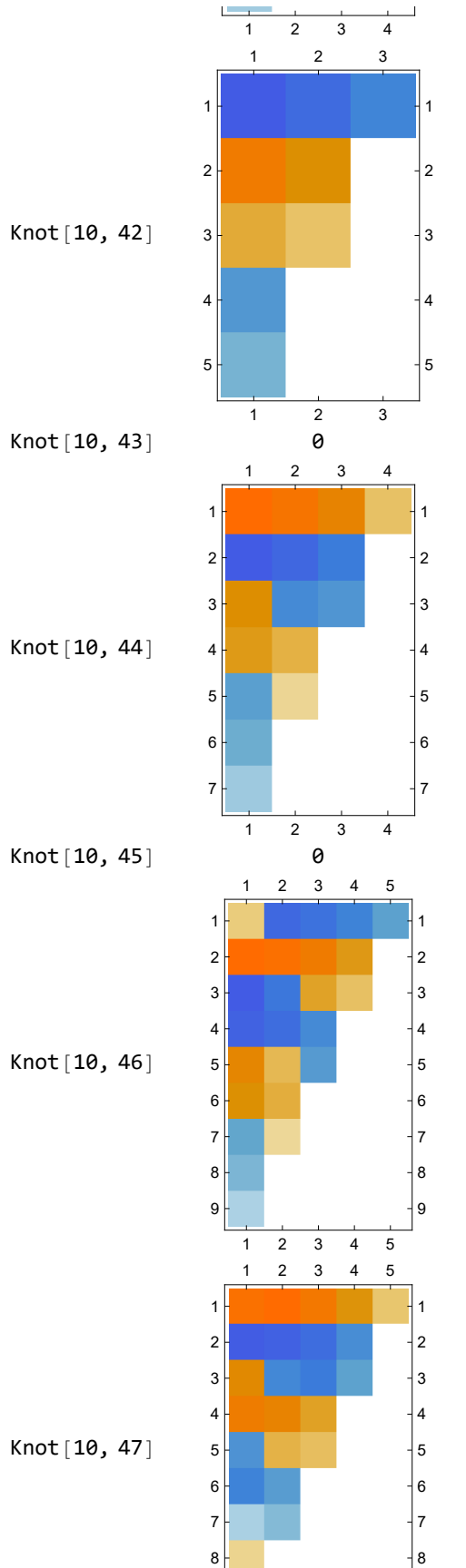


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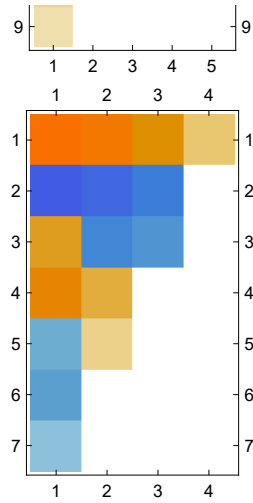




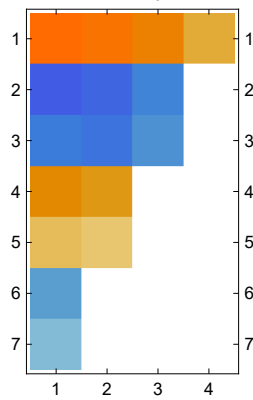




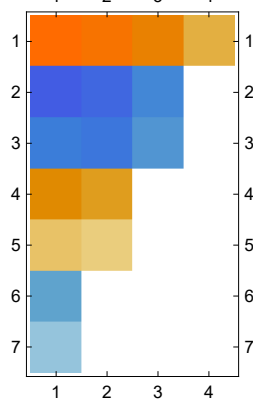
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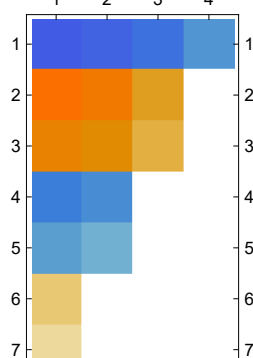
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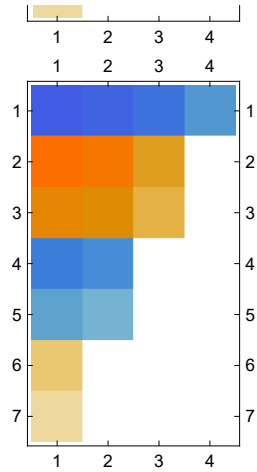
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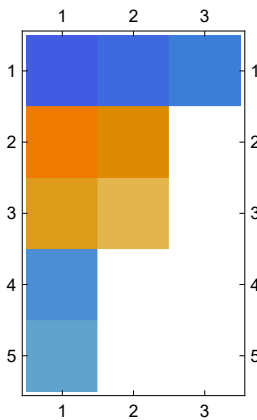
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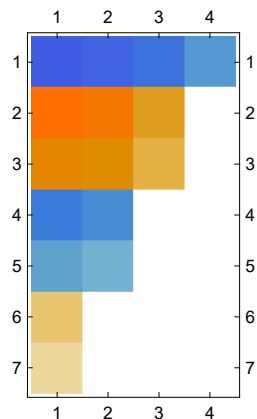
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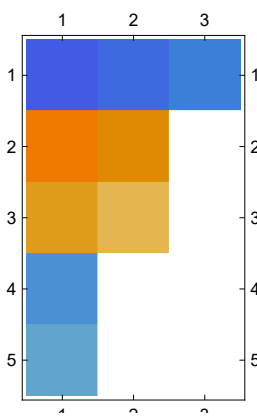
Knot [10, 53]



Knot [10, 54]

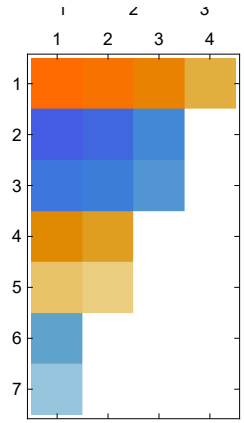


Knot [10, 55]

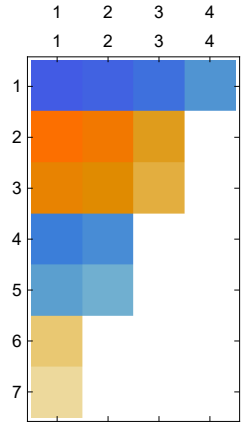




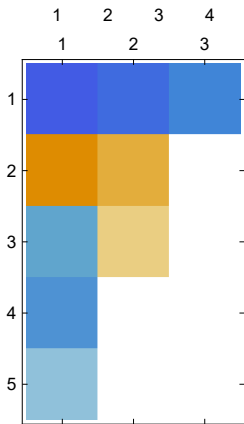
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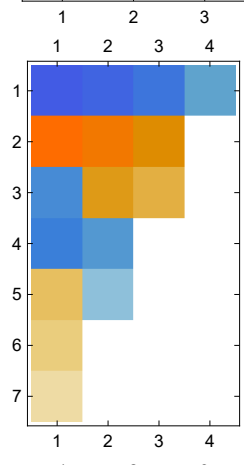
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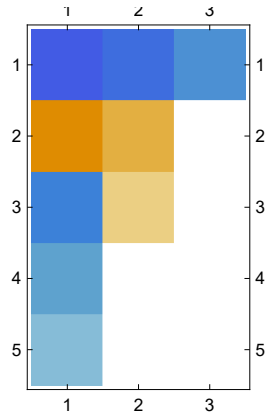
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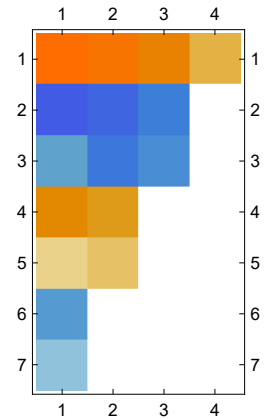
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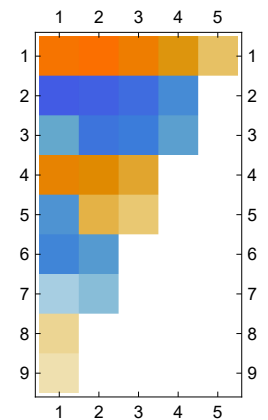
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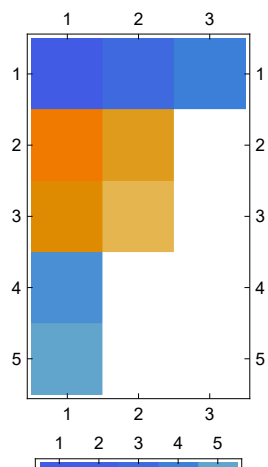
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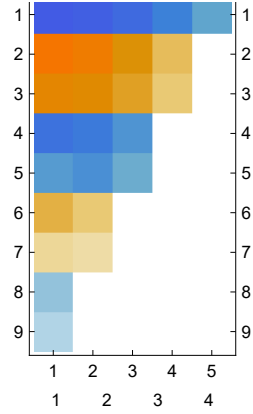
Knot [10, 62]



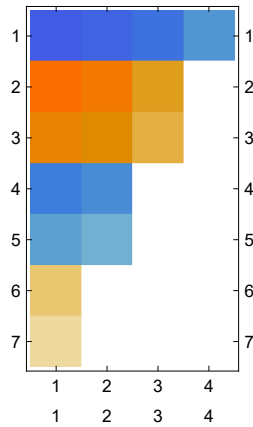
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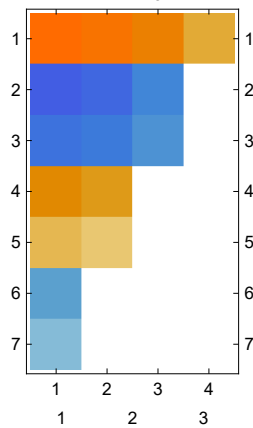
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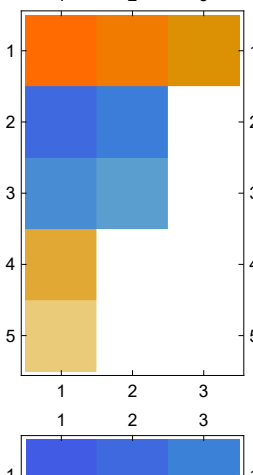
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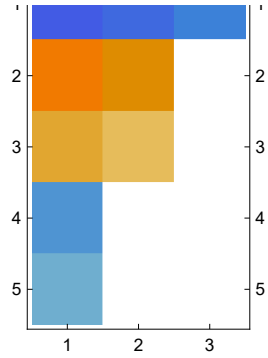
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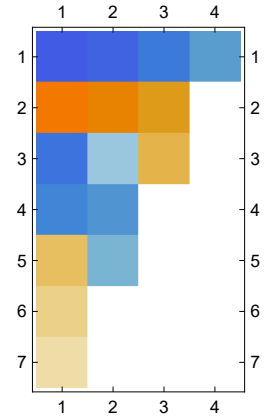
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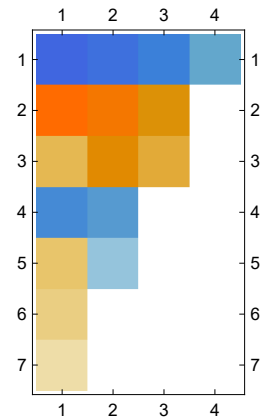
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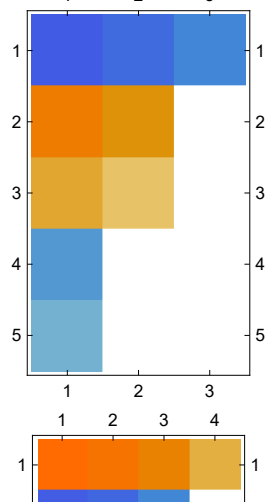
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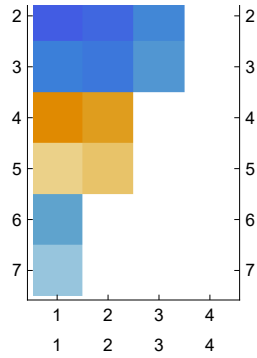
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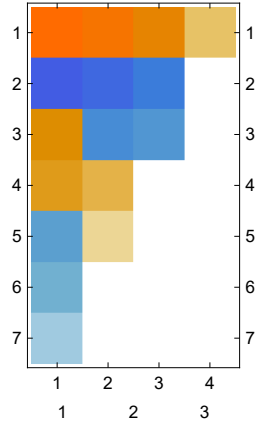
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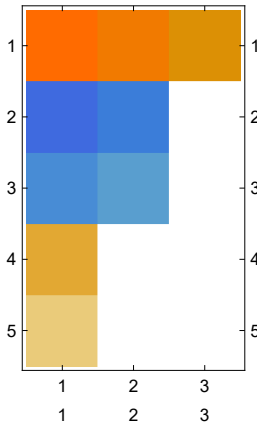
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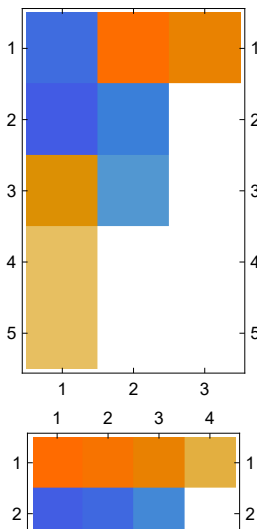
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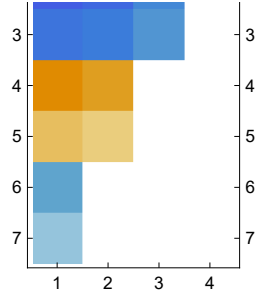
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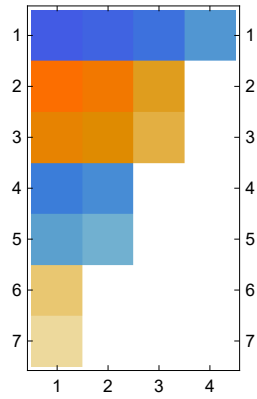
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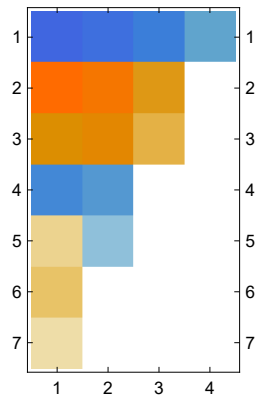
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Knot [10, 77]



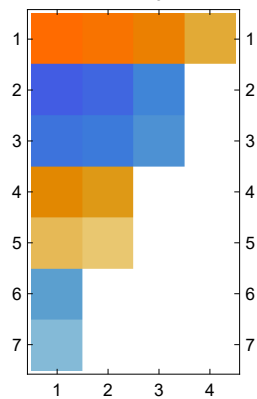
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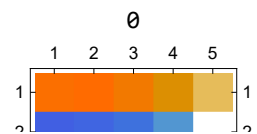
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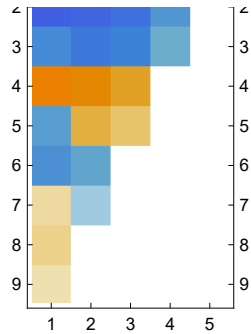
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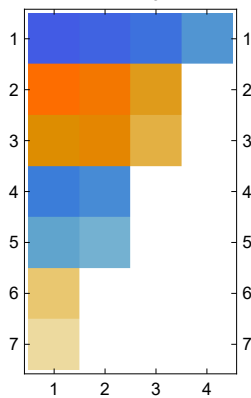
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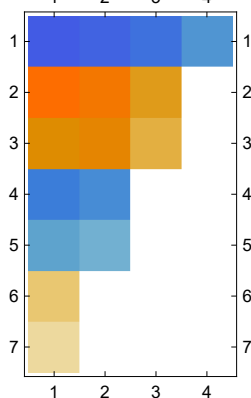
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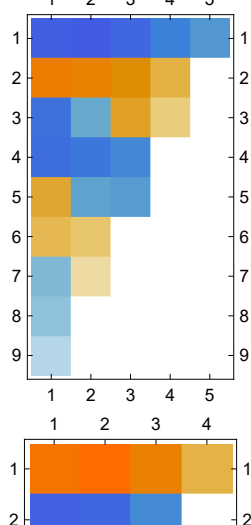
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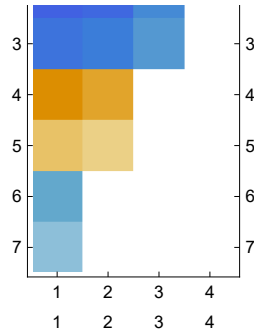
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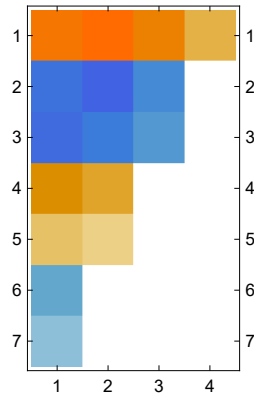
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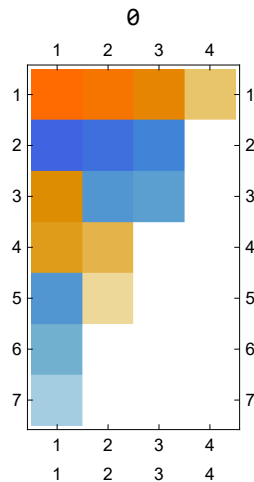
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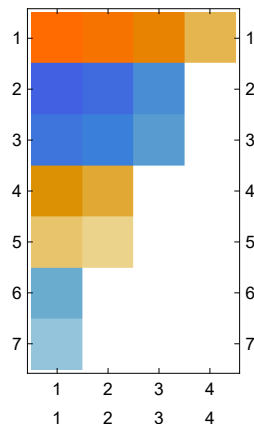
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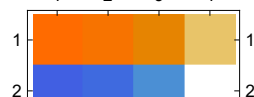
Knot [10, 88]



Knot [10, 89]

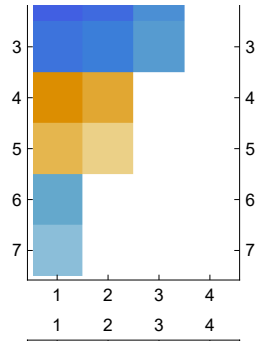


Knot [10, 90]

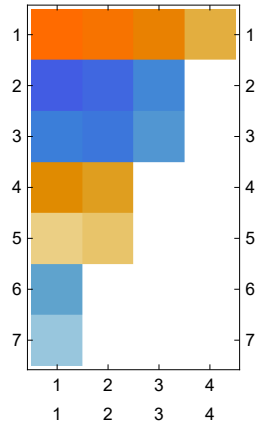




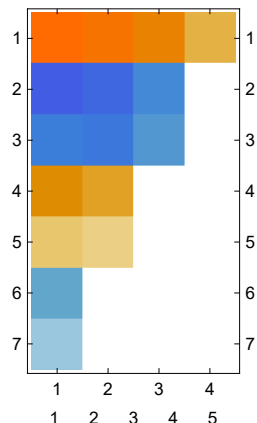
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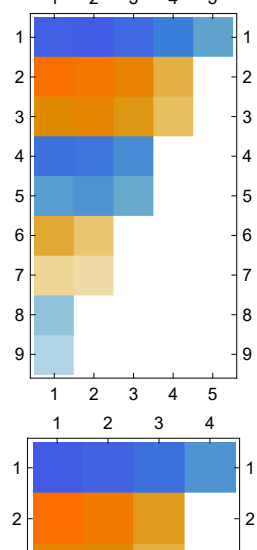
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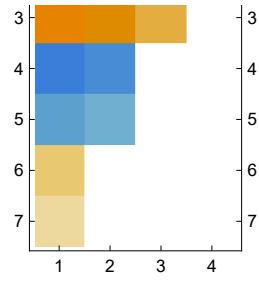
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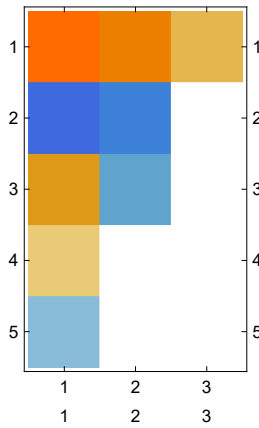
Knot [10, 94]



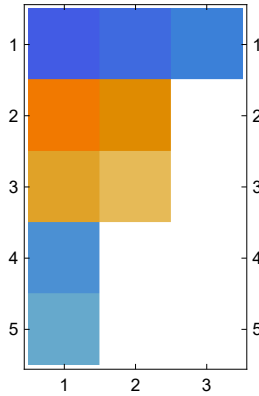
Knot [10, 95]



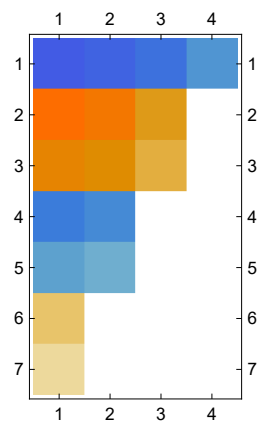
Knot [10, 96]



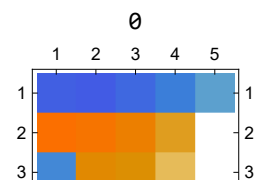
Knot [10, 97]



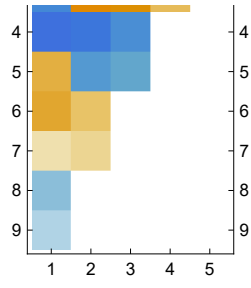
Knot [10, 98]



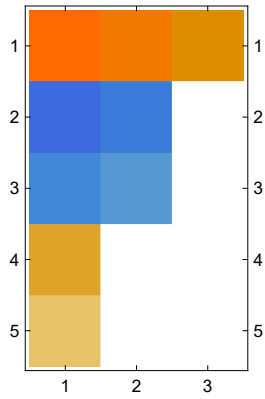
Knot [10, 99]



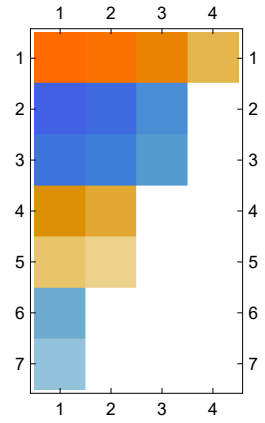
Knot [10, 100]



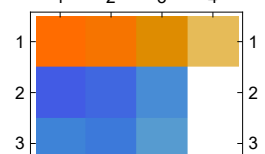
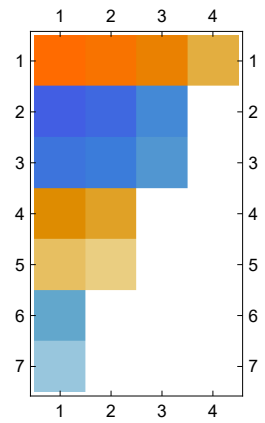
Knot [10, 101]



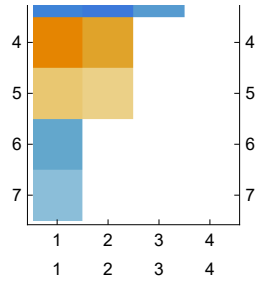
Knot [10, 102]



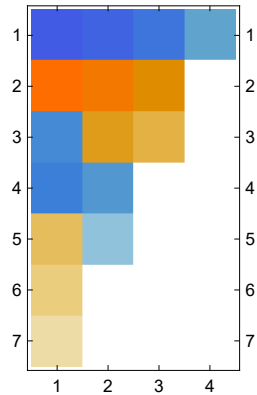
Knot [10, 103]



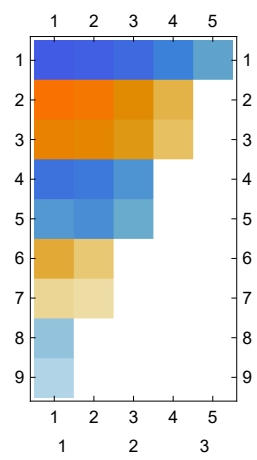
Knot [10, 104]



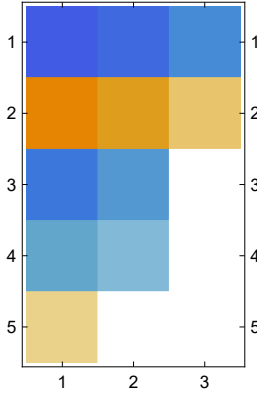
Knot [10, 105]

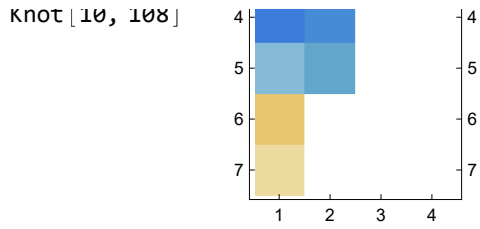


Knot [10, 106]

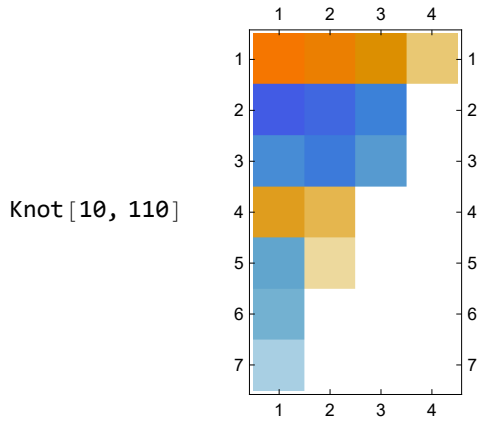


Knot [10, 107]

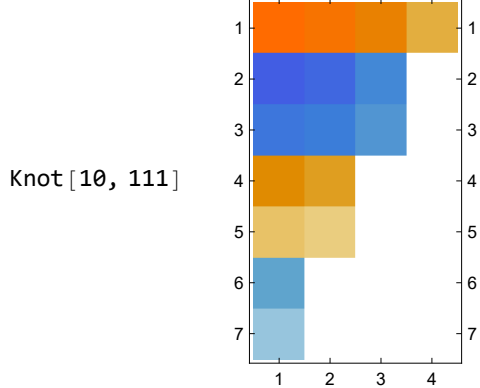




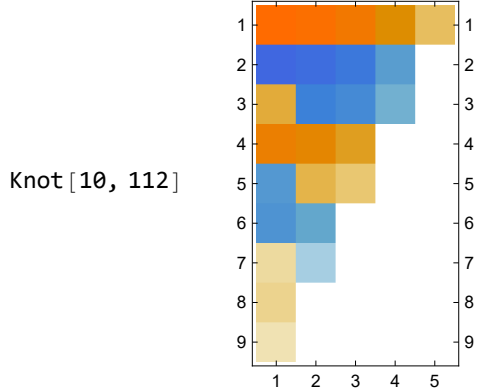
$\emptyset$



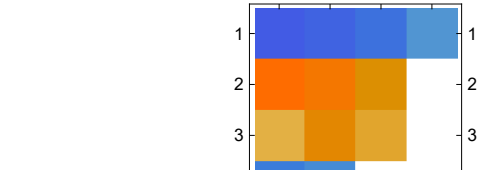
Knot [10, 110]

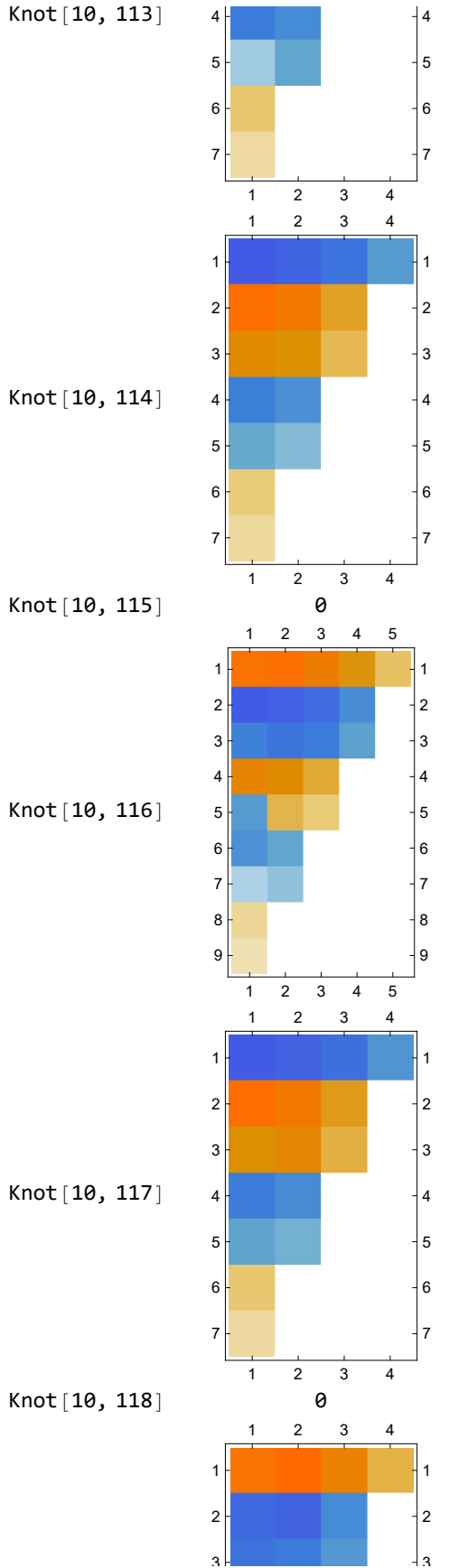


Knot [10, 111]

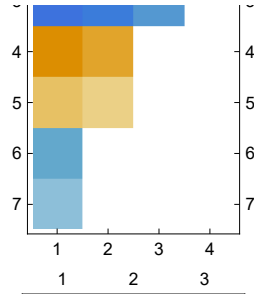


Knot [10, 112]

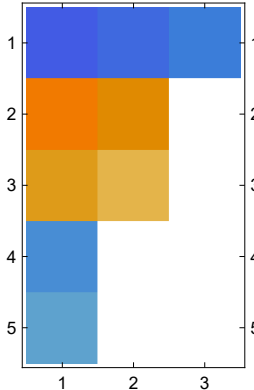




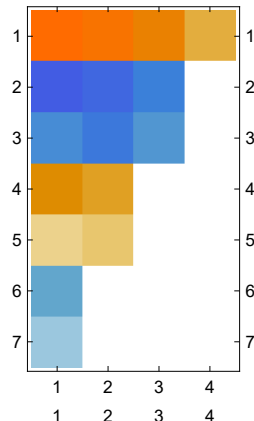
Knot [10, 119]



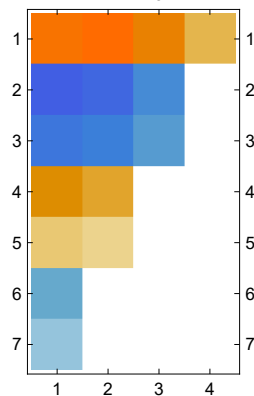
Knot [10, 120]



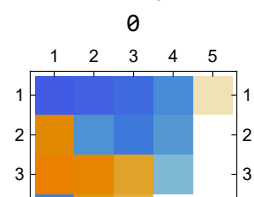
Knot [10, 121]



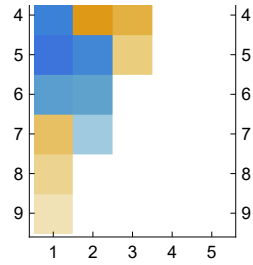
Knot [10, 122]



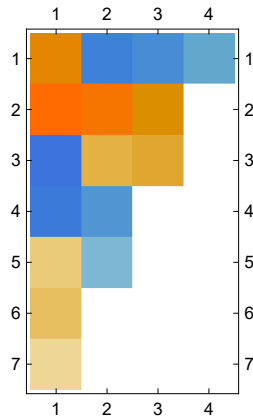
Knot [10, 123]



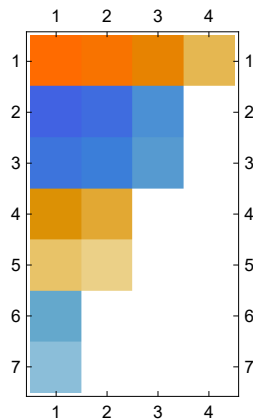
Knot [10, 124]



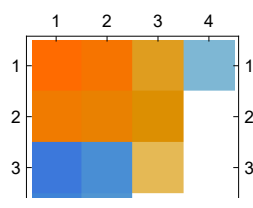
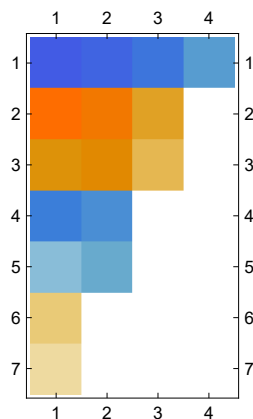
Knot [10, 125]



Knot [10, 126]

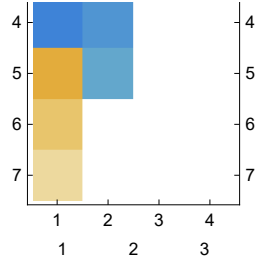


Knot [10, 127]

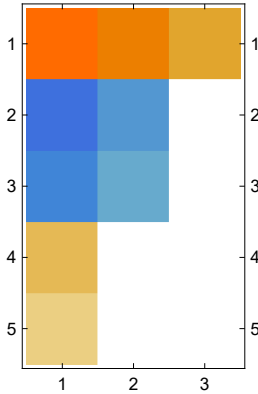




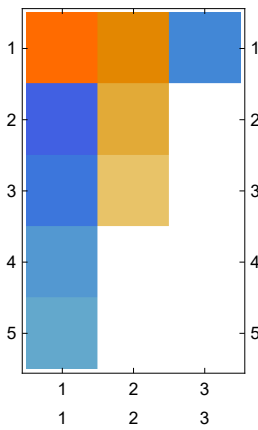
Knot [10, 128]



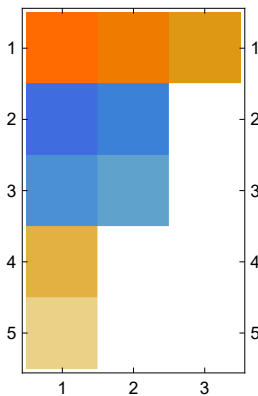
Knot [10, 129]



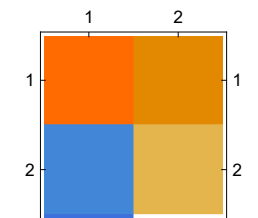
Knot [10, 130]



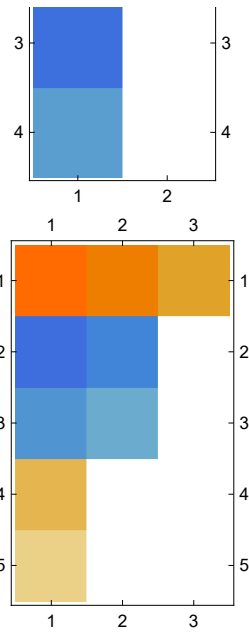
Knot [10, 131]



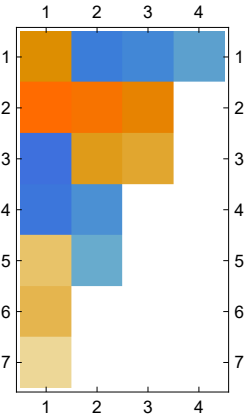
Knot [10, 132]



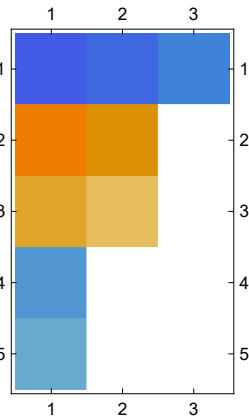
Knot [10, 133]



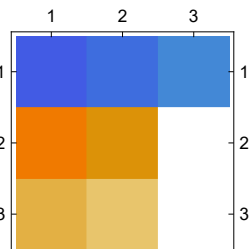
Knot [10, 134]



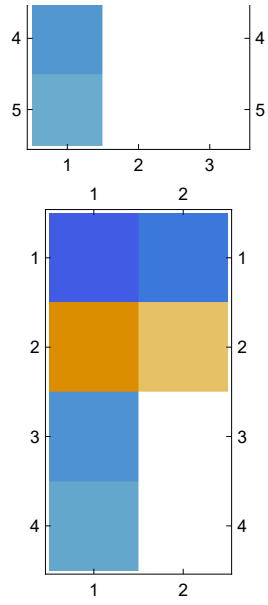
Knot [10, 135]



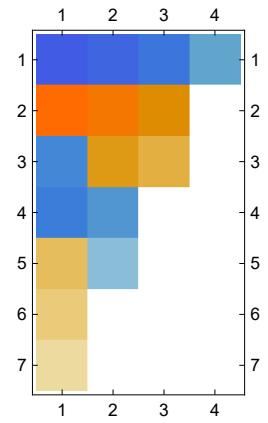
Knot [10, 136]



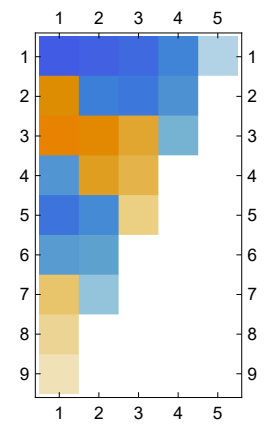
Knot [10, 137]



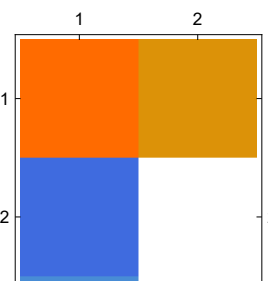
Knot [10, 138]



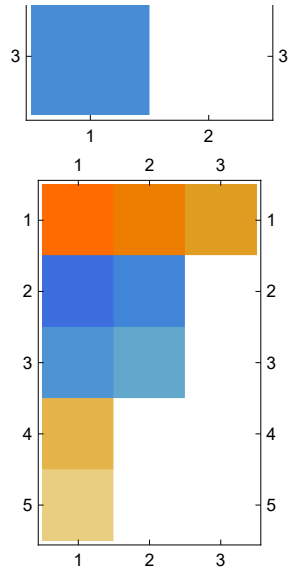
Knot [10, 139]



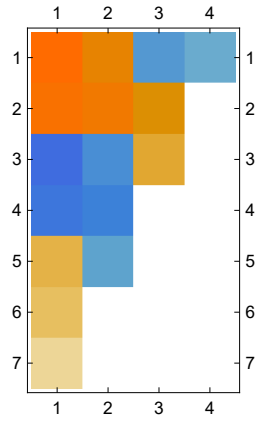
Knot [10, 140]



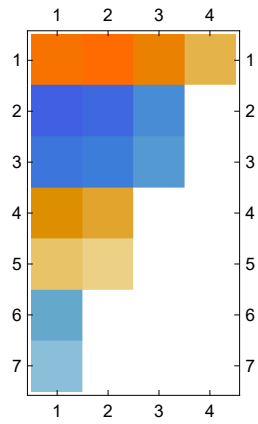
Knot [10, 141]



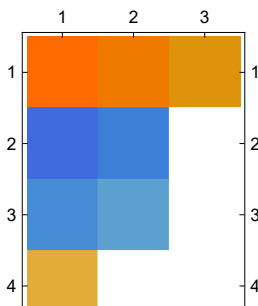
Knot [10, 142]



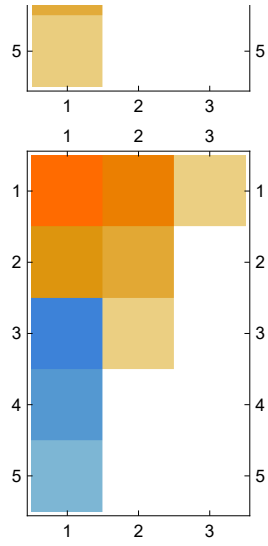
Knot [10, 143]



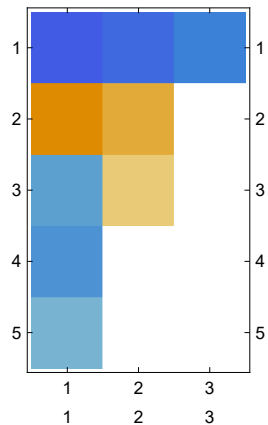
Knot [10, 144]



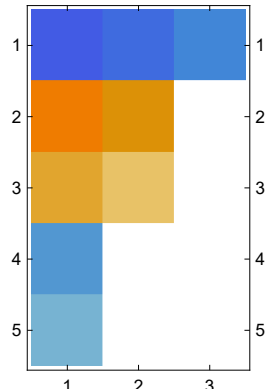
Knot [10, 145]



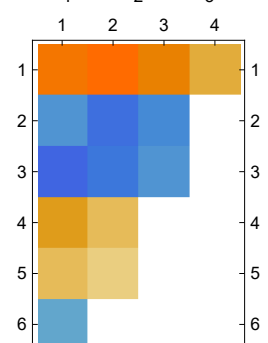
Knot [10, 146]



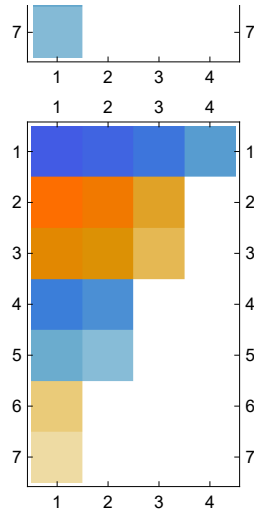
Knot [10, 147]



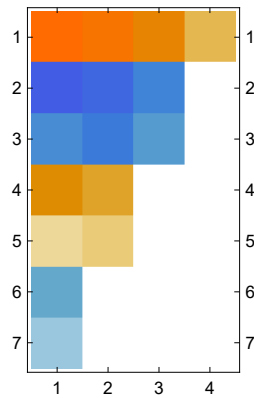
Knot [10, 148]



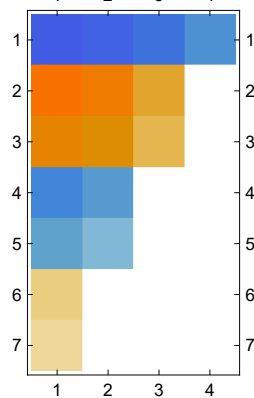
Knot [10, 149]



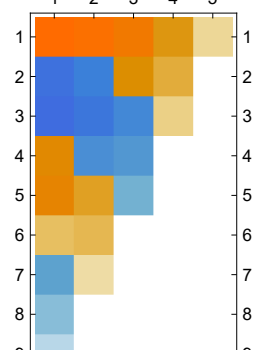
Knot [10, 150]



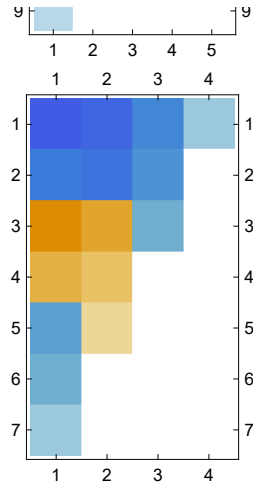
Knot [10, 151]



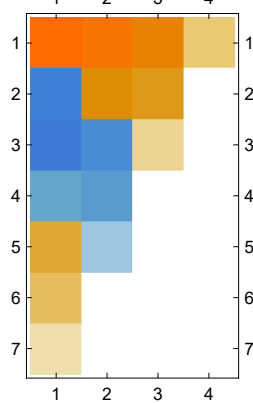
Knot [10, 152]



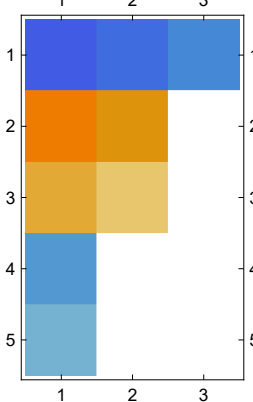
Knot [10, 153]



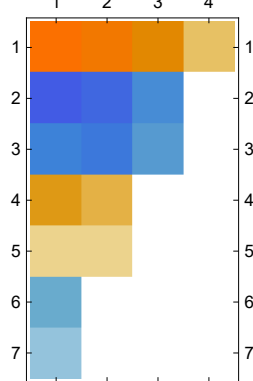
Knot [10, 154]



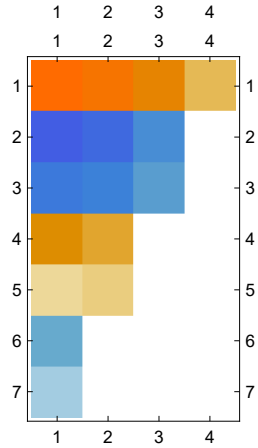
Knot [10, 155]



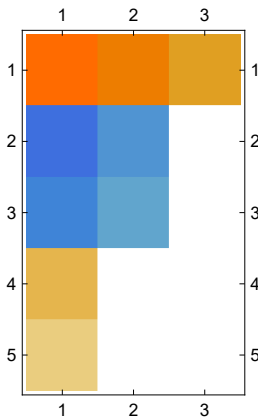
Knot [10, 156]



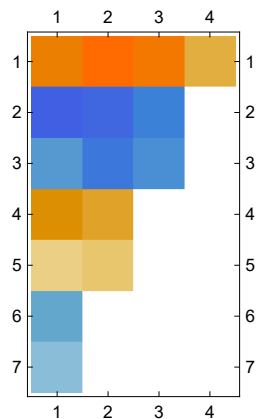
Knot [10, 157]



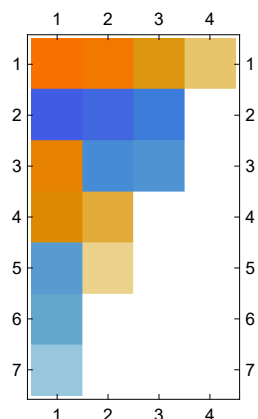
Knot [10, 158]



Knot [10, 159]

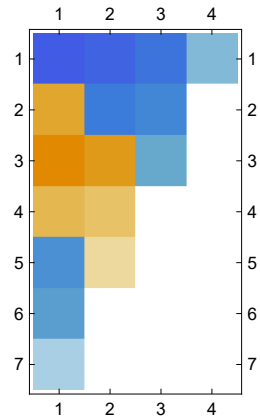


Knot [10, 160]

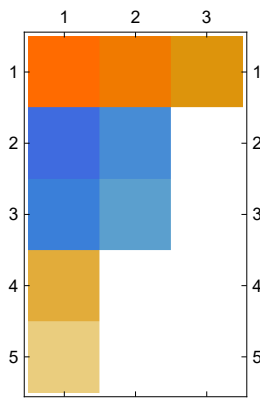




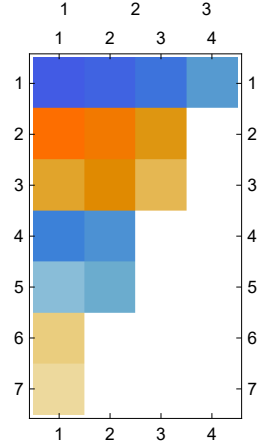
Knot [10, 161]



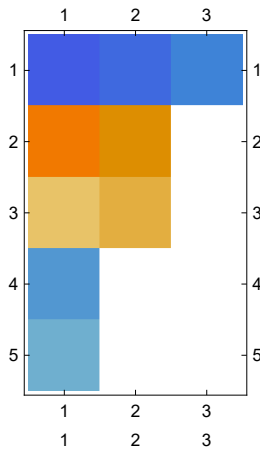
Knot [10, 162]

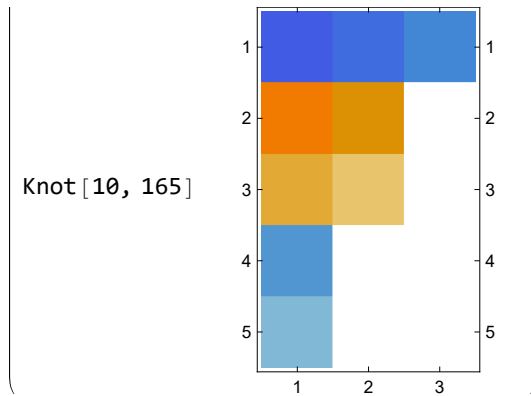


Knot [10, 163]



Knot [10, 164]





### Genus bound:

It appears that  $\text{deg}_V \leq g$ .

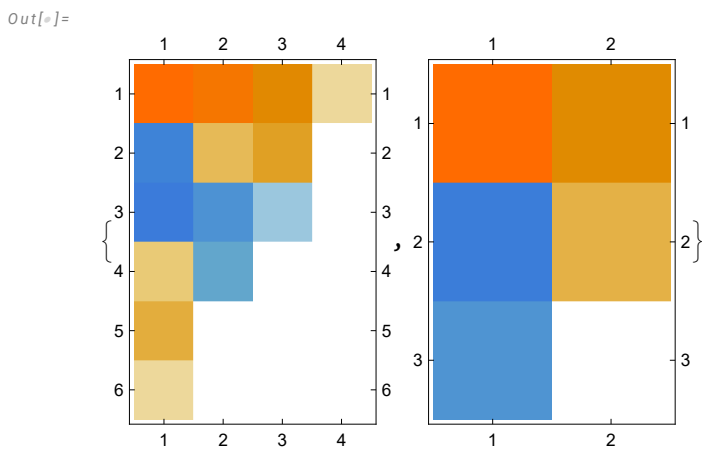
See also in the Conway and KT cases below. Conway has genus 3, KT genus 2.

### Specific knots

Conway and Kinoshita-Terasaka

```
In[*]:= {UVConway = ToUV[Theta[Knot[11, NonAlternating, 34]]][[2]],
         UVKT = ToUV[Theta[Knot[11, NonAlternating, 42]]][[2]]}
DrawUVPol /@ %
```

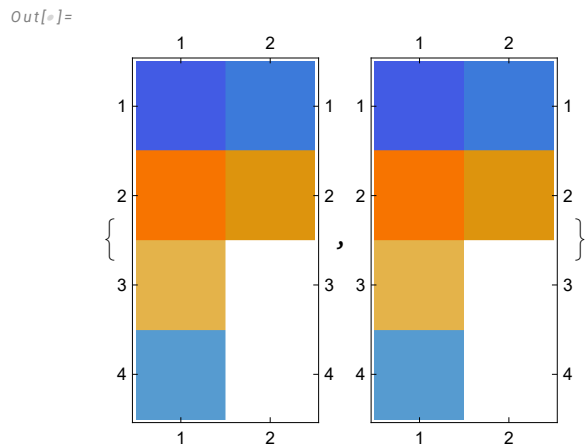
```
Out[*]= {2856 - 518 U - 612 U^2 + 20 U^3 + 40 U^4 + 4 U^5 + 1544 V + 33 U V -
         196 U^2 V - 28 U^3 V + 224 V^2 + 44 U V^2 - U^2 V^2 + 4 V^3, 40 - 6 U - 4 U^2 + 8 V + U V}
```



Mutant ninja turtles

```
In[*]:= {UVConway = ToUV[Theta[Knot[11, NonAlternating, 73]][[2]]],
         UVKT = ToUV[Theta[Knot[11, NonAlternating, 74]][[2]]] }
DrawUVPol /@ %
```

```
Out[*]= {-88 + 38 U + 4 U^2 - 2 U^3 - 24 V + 6 U V, -88 + 38 U + 4 U^2 - 2 U^3 - 24 V + 6 U V}
```



GST knot.

```
In[*]:= PD[GST48] = PD[X[1, 15, 2, 14], X[29, 2, 30, 3], X[40, 4, 41, 3],
                    X[4, 44, 5, 43], X[5, 26, 6, 27], X[95, 7, 96, 6], X[7, 1, 8, 96], X[8, 14, 9, 13],
                    X[28, 9, 29, 10], X[41, 11, 42, 10], X[11, 43, 12, 42], X[12, 27, 13, 28],
                    X[15, 31, 16, 30], X[61, 16, 62, 17], X[72, 17, 73, 18], X[83, 18, 84, 19],
                    X[34, 20, 35, 19], X[20, 89, 21, 90], X[92, 21, 93, 22], X[22, 79, 23, 80],
                    X[23, 68, 24, 69], X[24, 57, 25, 58], X[56, 25, 57, 26], X[31, 63, 32, 62],
                    X[32, 74, 33, 73], X[33, 85, 34, 84], X[35, 50, 36, 51], X[81, 37, 82, 36],
                    X[70, 38, 71, 37], X[59, 39, 60, 38], X[54, 39, 55, 40], X[55, 45, 56, 44],
                    X[45, 59, 46, 58], X[46, 70, 47, 69], X[47, 81, 48, 80], X[91, 49, 92, 48],
                    X[49, 91, 50, 90], X[82, 52, 83, 51], X[71, 53, 72, 52], X[60, 54, 61, 53],
                    X[74, 63, 75, 64], X[85, 64, 86, 65], X[65, 76, 66, 77], X[66, 87, 67, 88],
                    X[94, 67, 95, 68], X[86, 75, 87, 76], X[77, 88, 78, 89], X[93, 78, 94, 79]];
```

```
In[*]:= KGST48 = Theta[PD@GST48];
```

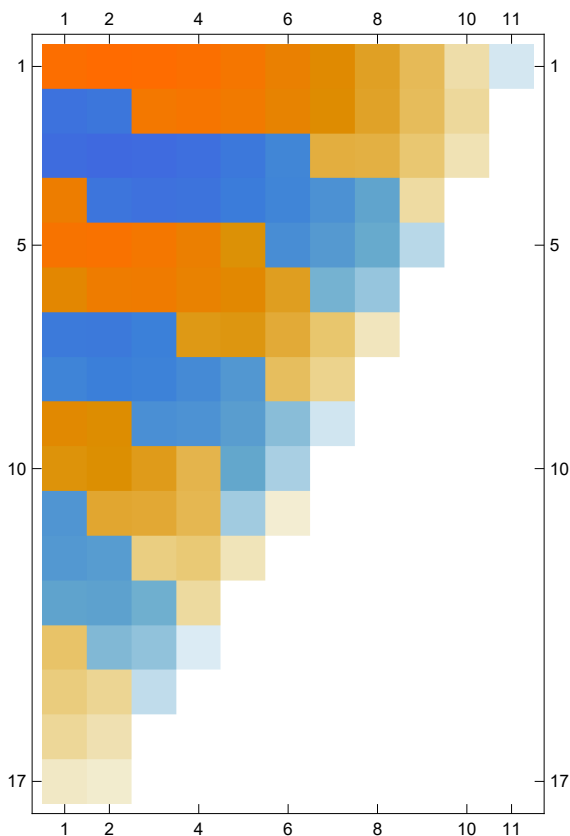
In[\*]:= **UVGST48 = ToUV [KGST48 [[2]]]**

Out[\*]=

$$\begin{aligned}
 &6230829076 - 1649181286U - 5550362737U^2 + 633563170U^3 + 2149291095U^4 + 57738350U^5 - \\
 &442863600U^6 - 68037954U^7 + 47087638U^8 + 13742818U^9 - 1713126U^{10} - 1133034U^{11} - 93673U^{12} + \\
 &27628U^{13} + 7084U^{14} + 634U^{15} + 21U^{16} + 13167733457V - 742113426UV - 10317864060U^2V - \\
 &780044732U^3V + 3238407625U^4V + 638880245U^5V - 474970634U^6V - 158493853U^7V + \\
 &24648280U^8V + 16630248U^9V + 1117975U^{10}V - 597951U^{11}V - 131649U^{12}V - 6085U^{13}V + \\
 &927U^{14}V + 120U^{15}V + 4U^{16}V + 11869957279V^2 + 1596094282UV^2 - 7694098809U^2V^2 - \\
 &1915654735U^3V^2 + 1772355983U^4V^2 + 673776096U^5V^2 - 139570447U^6V^2 - 95990994U^7V^2 - \\
 &4878592U^8V^2 + 4956644U^9V^2 + 1012288U^{10}V^2 + 5355U^{11}V^2 - 18588U^{12}V^2 - 2124U^{13}V^2 - \\
 &76U^{14}V^2 + 5974726186V^3 + 1846197822UV^3 - 2937035760U^2V^3 - 1250175184U^3V^3 + \\
 &401371993U^4V^3 + 272656716U^5V^3 + 6202565U^6V^3 - 20912710U^7V^3 - 3998030U^8V^3 + \\
 &181761U^9V^3 + 132950U^{10}V^3 + 14623U^{11}V^3 + 480U^{12}V^3 - 5U^{13}V^3 + 1838914446V^4 + \\
 &858092040UV^4 - 591691979U^2V^4 - 383311959U^3V^4 + 15686538U^4V^4 + 48517081U^5V^4 + \\
 &8278217U^6V^4 - 1141018U^7V^4 - 488295U^8V^4 - 48732U^9V^4 - 807U^{10}V^4 + 80U^{11}V^4 + 354683158V^5 + \\
 &214618897UV^5 - 52915707U^2V^5 - 59477229U^3V^5 - 7719781U^4V^5 + 3142057U^5V^5 + \\
 &991283U^6V^5 + 74251U^7V^5 - 3605U^8V^5 - 492U^9V^5 + U^{10}V^5 + 41939725V^6 + 30223366UV^6 + \\
 &486587U^2V^6 - 4238868U^3V^6 - 1043085U^4V^6 - 15128U^5V^6 + 18462U^6V^6 + 1428U^7V^6 - 13U^8V^6 + \\
 &2800418V^7 + 2267506UV^7 + 390623U^2V^7 - 87915U^3V^7 - 30306U^4V^7 - 1835U^5V^7 + 63U^6V^7 + \\
 &84191V^8 + 74924UV^8 + 17376U^2V^8 + 474U^3V^8 - 136U^4V^8 + 272V^9 + 596UV^9 + 115U^2V^9 - 12V^{10}
 \end{aligned}$$

In[\*]:= **DrawUVPol [UVGST48]**

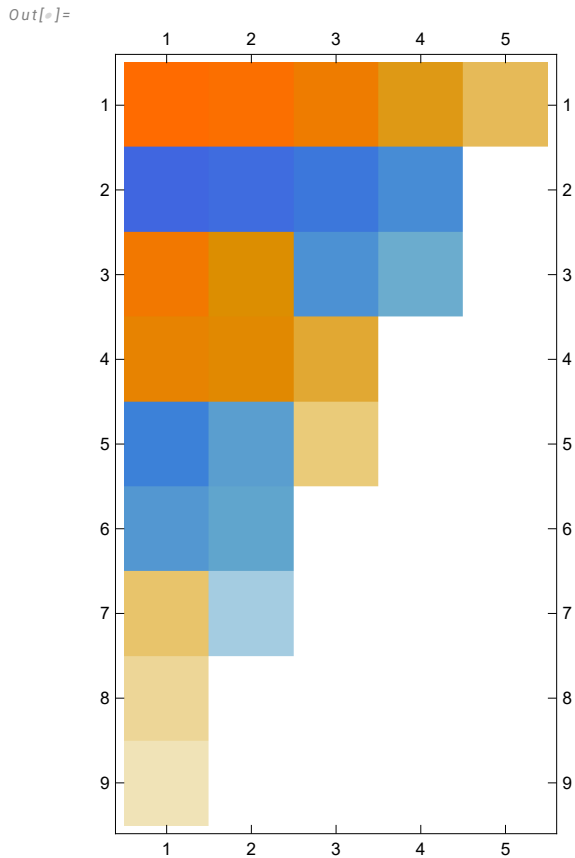
Out[\*]=



```
In[*]:= DunfieldKnotList =
ReadList["C:\\Users\\T15Roland\\Wiskunde\\Bn\\HigherRank\\nmd_random_knots.txt"] /.
{i_Integer -> i + 1};
```

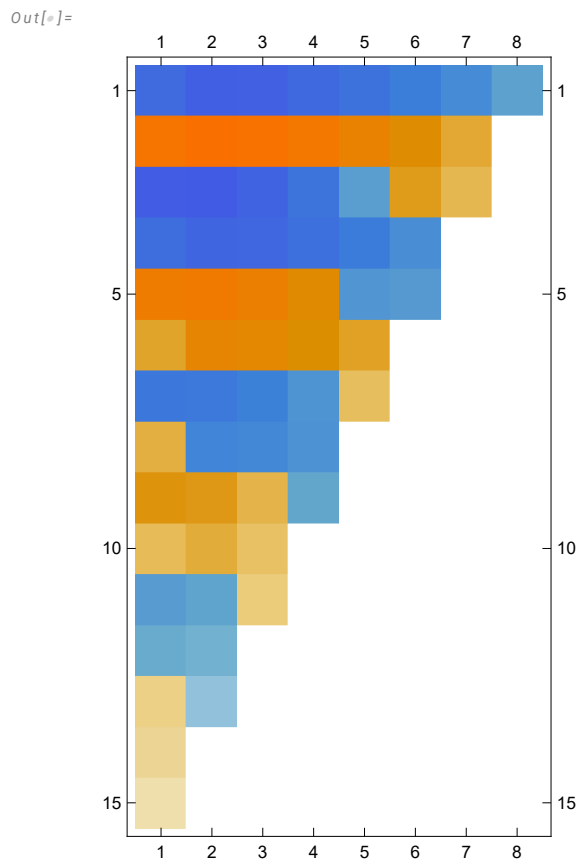
```
In[*]:= ToUV[0[DunfieldKnotList[[10]]][[2]]]
DrawUVPol@%
```

Out[\*]=  
 $99168 - 131978 U + 31970 U^2 + 16662 U^3 - 5055 U^4 - 1038 U^5 + 172 U^6 + 40 U^7 + 2 U^8 +$   
 $90274 V - 89599 U V + 7613 U^2 V + 10324 U^3 V - 648 U^4 V - 438 U^5 V - 30 U^6 V + 30861 V^2 -$   
 $20290 U V^2 - 1512 U^2 V^2 + 1496 U^3 V^2 + 162 U^4 V^2 + 4720 V^3 - 1542 U V^3 - 364 U^2 V^3 + 274 V^4$



```
In[*]:= ToUV[Theta[DunfieldKnotList[[30]]][[2]]]
DrawUVPol@%
```

```
Out[*]=
- 20 959 356 192 + 82 648 870 670 U - 61 420 204 654 U^2 - 12 889 058 040 U^3 + 21 952 491 586 U^4 +
75 909 790 U^5 - 3 467 252 696 U^6 + 32 343 128 U^7 + 314 994 260 U^8 + 11 593 600 U^9 - 15 968 084 U^10 -
1 697 514 U^11 + 310 109 U^12 + 64 702 U^13 + 3195 U^14 - 49 508 478 050 V + 147 417 992 421 U V -
79 306 207 340 U^2 V - 31 830 212 699 U^3 V + 25 568 303 784 U^4 V + 3 664 498 263 U^5 V -
3 278 502 945 U^6 V - 405 420 878 U^7 V + 203 012 405 U^8 V + 34 035 364 U^9 V - 4 288 830 U^10 V -
1 229 093 U^11 V - 70 217 U^12 V - 48 238 331 920 V^2 + 108 765 255 504 U V^2 - 37 844 869 967 U^2 V^2 -
25 625 045 308 U^3 V^2 + 10 333 553 045 U^4 V^2 + 3 195 589 246 U^5 V^2 - 902 413 026 U^6 V^2 -
257 790 994 U^7 V^2 + 21 112 027 U^8 V^2 + 9 629 496 U^9 V^2 + 653 692 U^10 V^2 - 25 424 737 904 V^3 +
42 535 474 929 U V^3 - 7 222 442 748 U^2 V^3 - 9 373 889 543 U^3 V^3 + 1 477 014 251 U^4 V^3 +
933 076 873 U^5 V^3 - 36 018 686 U^6 V^3 - 39 726 750 U^7 V^3 - 3 330 993 U^8 V^3 - 7 883 961 088 V^4 +
9 307 650 913 U V^4 - 10 398 780 U^2 V^4 - 1 621 282 746 U^3 V^4 - 32 734 022 U^4 V^4 + 90 701 424 U^5 V^4 +
9 987 666 U^6 V^4 - 1 444 915 816 V^5 + 1 081 283 525 U V^5 + 172 871 586 U^2 V^5 - 108 103 153 U^3 V^5 -
17 498 380 U^4 V^5 - 145 376 287 V^6 + 52 130 232 U V^6 + 16 396 920 U^2 V^6 - 6 208 317 V^7
```



(\*My ToUV is too slow to handle this\*)

```
In[*]:= DK120 = << Theta4DK120.m;
```

# Invariance Proof