

## Bulk-stitching the simplified Ico invariant (normalized by $\omega^2$ , knot only version).

Input: Crossings  $R_{1,a,b}, R_{-1,a,b}$ , (rightmoving) cuaps,  $u_{1,a}$  and  $u_{-1,a} = n_a$  (collectively known as Pieces), labeled 1,...n and stitching instructions as a permutation P of  $\{1,...n\}$ .

Output: The 1-co invariant of the knot, only the coefficient of epsilon of the constant term.

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

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

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adj[m_] := Map[Reverse, Minors[Transpose[m], Length[m] - 1], {0, 1}]
Table[(-1)^(i + j), {i, Length[m]}, {j, Length[m]}] (*We write Inverse=adj/Det.*)
Zp[Pieces_] := Block[{N, A, adA, ω, Q, W, H, G, ZG, ZH, corr, ZZ},
  N = Length[P];
  corr = Times@@(Pieces /. {Rs_, i_, j_ -> t^-s, us_, i_ -> t^-s});
  Q = SparseArray[Pieces /.
    {Rs_, i_, j_ -> {{i, j} -> -s t^(s/2), {j, j} -> s t^(s/2)}, xs_, i_ -> Nothing} // Flatten, {N, N}];
  Pos[i_] := FirstPosition[P, i][[1]];
  W = Table[If[Pos[i] < Pos[j], 1, 0], {i, 1, N}, {j, 1, N}];
  A = IdentityMatrix[N] - (t^(1/2) - t^(-1/2)) W.Q // Together;
  ω = corr^(1/2) Det[A];
  adA = adj[A];
  G = Q.adA; (*Normalized by ω, note we left ω^-1 out.*)
  H = adA.W; (*Normalized by ω, note we left ω^-1 out.*)
  ZG = (t - t^-1) Sum[
    G[[j, a]] (1/2 G[[j, b]] + Sum[G[[c, b]], {c, Take[P, {Pos[j] + 1, N}]}]), {j, P},
    {a, Take[P, Pos[j] - 1]}, {b, Take[P, Pos[j] - 1]}] // Together // Expand;
  ZH = Plus@@(Pieces /. {
    Rs_, i_, j_ -> (s (1 - t^s)^2 / 2 H[[j, i]]^2 - s (1 + t^s)^2 / 2 H[[j, j]]^2 + s t^s (H[[j, i]] H[[i, j]] + H[[i, i]] H[[j, j]] -
      t^s (1 - t) H[[j, i]] ((1 + s) H[[j, j]] + (1 - s) H[[i, i]])),
    us_, i_ -> s Det[A] H[[i, i]] (*Normalized by ω*)
  }) // Together // Expand;
  ZZ = corr (ZH + ZG) // Together;
  {ω, ZZ} // PowerExpand // Expand
]
(*Rozansky's normalization ρ1*)
ρp[Pieces_] := Block[{ZZ, Z, ω},
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ZZ = Zp[Pieces];
ω = ZZ[[1]];
Z = ZZ[[2]];

Normal[Series[ $\frac{-t}{(1-t)^2} (Z - t \omega D[\omega, t])$ , {t, Infinity, 0}]]
]

RVK::usage =
"RVK[xs, rots] represents a Rotational Virtual Knot with a list of n Xp/Xm crossings
xs and a length 2n list of rotation numbers rots. Crossing sites
are indexed 1 through 2n, and rots[[k]] is the rotation between
site k-1 and site k. RVK is also a casting operator converting
to the RVK presentation from other knot presentations.";
RVK[pd_PD] := Module[{n, xs, x, rots, front, k},
n = Length[pd];
xs = List @@ pd /. x_X => If[PositiveQ[x], Xp[x[[4]], x[[1]], Xm[x[[2]], x[[1]]];
rots = Table[0, {2 n}];
front = {0};
For[k = 0, k < 2 n, ++k,
If[k == 0 ∨ FreeQ[front, -k],
front = Flatten[front /. k → Catch[xs /. {
Xp[k + 1, L_] | Xm[L_, k + 1] => Throw[{L, k + 1, 1 - L}],
Xp[L_, k + 1] | Xm[k + 1, L_] => (++rots[[L]]; Throw[{1 - L, k + 1, L})
}]],
If[MatchQ[front, {____, k, ____, -k, ____}], --rots[[k + 1]]
]
];
RVK[xs, rots]
];
RVK[K_] := RVK[PD[K]];

(*A non-fast procedure to calculate the 1-
co invariant from the KnotTheory table knots via RVK format*)
ρRVK[K_] := Module[{RV, L, Piec, news, Pe},
RV = RVK[K];
L = Length[RV[[2]]];
Piec = RV[[1]] /. {Xm[a_, b_] → R-1,a,b, Xp[a_, b_] → R1,a,b};
Pe = Range[L];
news = 1;
For[i = 1, i <= L, i++,
If[RV[[2]][[i]] == 1, Piec = Append[Piec, u1,news+L];
Pe = Pe /. {i → {news + L, i}} // Flatten; news++;
If[RV[[2]][[i]] == -1, Piec = Append[Piec, u-1,news+L];
Pe = Pe /. {i → {news + L, i}} // Flatten; news++;
]; Clear[i];
ρPe[Piec]
]

Z{1,2,3,4,5,6,7} [{R1,1,5, R1,6,2, R1,3,7, u-1,4}]

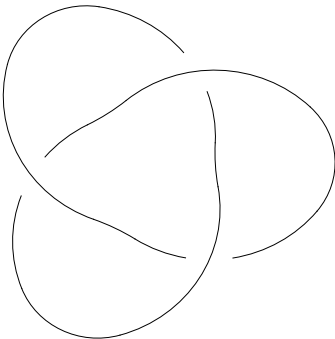
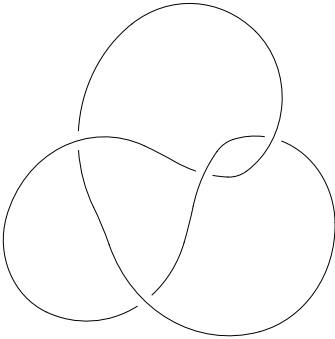
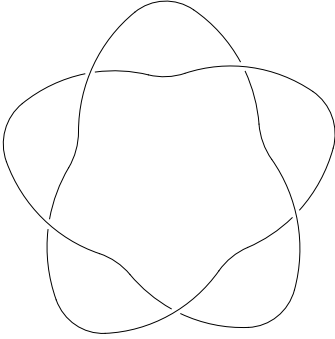
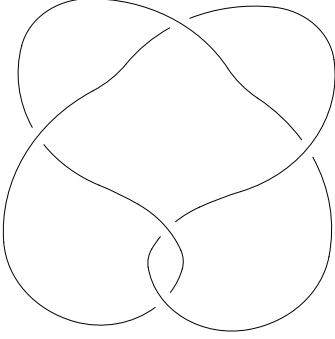
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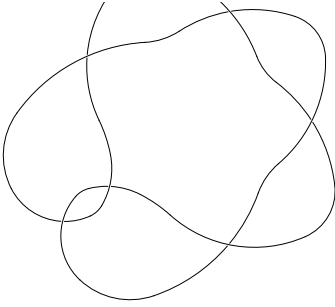
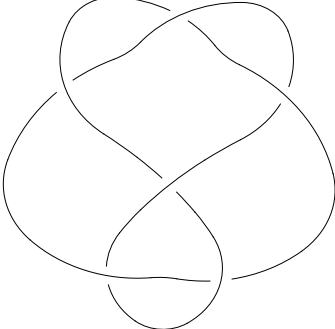
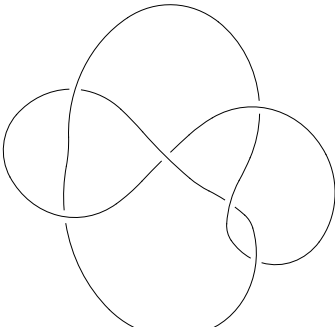
$$\left\{-1 + \frac{1}{t} + t, 2 - \frac{1}{t} - 3t + 2t^2\right\}$$

$\rho_{RVK}[\text{Knot}[3, 1]]$

$t$

$\{\#, \text{DrawPD}[\#], \rho_{RVK}[\#]\} \& /@ \text{AllKnots}[\{3, 6\}] // \text{MatrixForm}$

Knot[3, 1]		$t$
Knot[4, 1]		$\emptyset$
Knot[5, 1]		$3t + 2t^3$
Knot[5, 2]		$-4 + 5t$

Knot [6, 1]		$-4 + t$
Knot [6, 2]		$-4 + 4 t - 4 t^2 + t^3$
Knot [6, 3]		$0$

```
{#, ρRVK[#]} & /@AllKnots[{3, 10}] // MatrixForm // Timing
```

Knot [3, 1]	$t$
Knot [4, 1]	$0$
Knot [5, 1]	$3 t + 2 t^3$
Knot [5, 2]	$-4 + 5 t$
Knot [6, 1]	$-4 + t$
Knot [6, 2]	$-4 + 4 t - 4 t^2 + t^3$
Knot [6, 3]	$0$
Knot [7, 1]	$6 t + 5 t^3 + 3 t^5$
Knot [7, 2]	$-16 + 14 t$
Knot [7, 3]	$12 - 16 t + 8 t^2 - 9 t^3$
Knot [7, 4]	$32 - 24 t$
Knot [7, 5]	$-28 + 29 t - 16 t^2 + 9 t^3$
Knot [7, 6]	$-20 + 19 t - 8 t^2 + t^3$
Knot [7, 7]	$8 - 3 t$
Knot [8, 1]	$-16 + 5 t$
Knot [8, 2]	$-12 + 13 t - 12 t^2 + 10 t^3 - 8 t^4 + 2 t^5$
Knot [8, 3]	$0$
Knot [8, 4]	$-4 + 6 t - 8 t^2 + 3 t^3$
Knot [8, 5]	$24 - 22 t + 20 t^2 - 13 t^3 + 8 t^4 - 2 t^5$
Knot [8, 6]	$-32 + 28 t - 20 t^2 + 5 t^3$

Knot [8, 7]	$12 - 13 t + 12 t^2 - 10 t^3 + 4 t^4 - t^5$
Knot [8, 8]	$16 - 12 t + 4 t^2 - t^3$
Knot [8, 9]	$0$
Knot [8, 10]	$20 - 21 t + 16 t^2 - 11 t^3 + 4 t^4 - t^5$
Knot [8, 11]	$-44 + 39 t - 24 t^2 + 5 t^3$
Knot [8, 12]	$0$
Knot [8, 13]	$20 - 14 t + 4 t^2 - t^3$
Knot [8, 14]	$-68 + 57 t - 28 t^2 + 5 t^3$
Knot [8, 15]	$-140 + 120 t - 64 t^2 + 21 t^3$
Knot [8, 16]	$-36 + 35 t - 28 t^2 + 17 t^3 - 6 t^4 + t^5$
Knot [8, 17]	$0$
Knot [8, 18]	$0$
Knot [8, 19]	$-3 t - 4 t^2 - 3 t^5$
Knot [8, 20]	$-4 + 4 t$
Knot [8, 21]	$-20 + 16 t - 8 t^2 + t^3$
Knot [9, 1]	$10 t + 9 t^3 + 7 t^5 + 4 t^7$
Knot [9, 2]	$-40 + 30 t$
Knot [9, 3]	$24 - 32 t + 20 t^2 - 25 t^3 + 12 t^4 - 13 t^5$
Knot [9, 4]	$-44 + 46 t - 28 t^2 + 23 t^3$
Knot [9, 5]	$100 - 65 t$
Knot [9, 6]	$-64 + 68 t - 52 t^2 + 45 t^3 - 24 t^4 + 13 t^5$
Knot [9, 7]	$-108 + 99 t - 56 t^2 + 23 t^3$
Knot [9, 8]	$-28 + 29 t - 16 t^2 + 3 t^3$
Knot [9, 9]	$-96 + 98 t - 72 t^2 + 55 t^3 - 24 t^4 + 13 t^5$
Knot [9, 10]	$120 - 114 t + 72 t^2 - 40 t^3$
Knot [9, 11]	$64 - 66 t + 52 t^2 - 41 t^3 + 16 t^4 - 2 t^5$
Knot [9, 12]	$-100 + 84 t - 36 t^2 + 5 t^3$
Knot [9, 13]	$168 - 154 t + 92 t^2 - 40 t^3$
Knot [9, 14]	$60 - 35 t + 8 t^2 - t^3$
Knot [9, 15]	$136 - 108 t + 40 t^2 - 5 t^3$
Knot [9, 16]	$168 - 161 t + 120 t^2 - 80 t^3 + 36 t^4 - 13 t^5$
Knot [9, 17]	$-24 + 28 t - 32 t^2 + 23 t^3 - 8 t^4 + t^5$
Knot [9, 18]	$-220 + 193 t - 108 t^2 + 40 t^3$
Knot [9, 19]	$-24 + 20 t - 8 t^2 + t^3$
Knot [9, 20]	$-124 + 117 t - 84 t^2 + 47 t^3 - 16 t^4 + 2 t^5$
Knot [9, 21]	$164 - 127 t + 44 t^2 - 5 t^3$
Knot [9, 22]	$36 - 40 t + 38 t^2 - 24 t^3 + 8 t^4 - t^5$
Knot [9, 23]	$-288 + 243 t - 128 t^2 + 40 t^3$
Knot [9, 24]	$-20 + 16 t - 4 t^2$
Knot [9, 25]	$-188 + 153 t - 70 t^2 + 12 t^3$
Knot [9, 26]	$92 - 85 t + 64 t^2 - 31 t^3 + 8 t^4 - t^5$
Knot [9, 27]	$-32 + 24 t - 8 t^2 + t^3$
Knot [9, 28]	$-120 + 105 t - 68 t^2 + 30 t^3 - 8 t^4 + t^5$
Knot [9, 29]	$-56 + 59 t - 48 t^2 + 26 t^3 - 8 t^4 + t^5$
Knot [9, 30]	$-32 + 25 t - 10 t^2 + 2 t^3$
Knot [9, 31]	$-152 + 132 t - 80 t^2 + 33 t^3 - 8 t^4 + t^5$
Knot [9, 32]	$148 - 133 t + 94 t^2 - 42 t^3 + 10 t^4 - t^5$
Knot [9, 33]	$-40 + 30 t - 10 t^2 + t^3$
Knot [9, 34]	$-56 + 43 t - 18 t^2 + 3 t^3$
Knot [9, 35]	$-144 + 90 t$
Knot [9, 36]	$88 - 87 t + 66 t^2 - 44 t^3 + 16 t^4 - 2 t^5$
Knot [9, 37]	$-28 + 22 t - 8 t^2 + t^3$

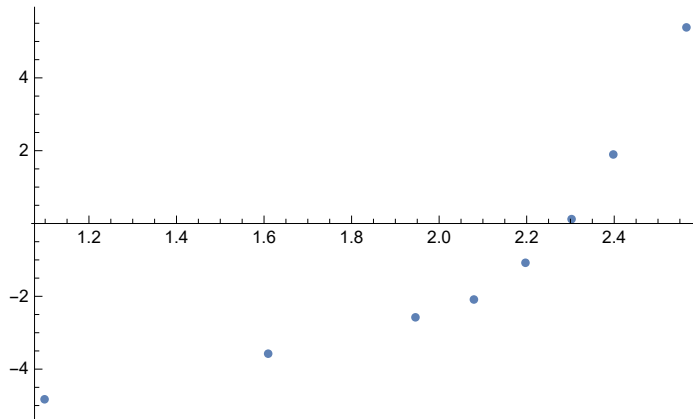
Knot [9, 38]	$-452 + 382 t - 204 t^4 + 62 t^5$
Knot [9, 39]	$268 - 210 t + 84 t^2 - 12 t^3$
Knot [9, 40]	$-264 + 229 t - 144 t^2 + 57 t^3 - 12 t^4 + t^5$
Knot [9, 41]	$-108 + 70 t - 20 t^2 + 3 t^3$
Knot [9, 42]	$-4 + t + 2 t^2 - t^3$
Knot [9, 43]	$4 - 5 t + 2 t^2 - 7 t^3 + 8 t^4 - 2 t^5$
Knot [9, 44]	$-12 + 9 t - 2 t^2$
Knot [9, 45]	$-60 + 47 t - 14 t^2 + t^3$
Knot [9, 46]	$-12 + 3 t$
Knot [9, 47]	$12 - 10 t + 16 t^2 - 15 t^3 + 6 t^4 - t^5$
Knot [9, 48]	$52 - 42 t + 12 t^2 - t^3$
Knot [9, 49]	$60 - 61 t + 38 t^2 - 21 t^3$
Knot [10, 1]	$-40 + 14 t$
Knot [10, 2]	$-24 + 27 t - 24 t^2 + 24 t^3 - 20 t^4 + 16 t^5 - 12 t^6 + 3 t^7$
Knot [10, 3]	$-28 + 11 t$
Knot [10, 4]	$8 + t - 8 t^2 + 4 t^3$
Knot [10, 5]	$36 - 39 t + 36 t^2 - 36 t^3 + 28 t^4 - 20 t^5 + 8 t^6 - 2 t^7$
Knot [10, 6]	$-84 + 81 t - 72 t^2 + 56 t^3 - 36 t^4 + 9 t^5$
Knot [10, 7]	$-160 + 135 t - 72 t^2 + 14 t^3$
Knot [10, 8]	$-24 + 26 t - 28 t^2 + 23 t^3 - 20 t^4 + 7 t^5$
Knot [10, 9]	$28 - 28 t + 28 t^2 - 25 t^3 + 20 t^4 - 10 t^5 + 4 t^6 - t^7$
Knot [10, 10]	$100 - 71 t + 24 t^2 - 5 t^3$
Knot [10, 11]	$-72 + 68 t - 52 t^2 + 16 t^3$
Knot [10, 12]	$92 - 89 t + 72 t^2 - 50 t^3 + 20 t^4 - 5 t^5$
Knot [10, 13]	$-84 + 51 t - 12 t^2 + t^3$
Knot [10, 14]	$-236 + 225 t - 180 t^2 + 119 t^3 - 52 t^4 + 9 t^5$
Knot [10, 15]	$12 - 17 t + 24 t^2 - 24 t^3 + 12 t^4 - 3 t^5$
Knot [10, 16]	$80 - 76 t + 56 t^2 - 16 t^3$
Knot [10, 17]	$0$
Knot [10, 18]	$-140 + 121 t - 68 t^2 + 16 t^3$
Knot [10, 19]	$-24 + 30 t - 40 t^2 + 35 t^3 - 16 t^4 + 3 t^5$
Knot [10, 20]	$-104 + 88 t - 56 t^2 + 14 t^3$
Knot [10, 21]	$-124 + 121 t - 104 t^2 + 80 t^3 - 44 t^4 + 9 t^5$
Knot [10, 22]	$44 - 37 t + 24 t^2 - 10 t^3 + 4 t^4 - t^5$
Knot [10, 23]	$144 - 137 t + 108 t^2 - 67 t^3 + 24 t^4 - 5 t^5$
Knot [10, 24]	$-268 + 221 t - 116 t^2 + 24 t^3$
Knot [10, 25]	$-344 + 314 t - 232 t^2 + 131 t^3 - 52 t^4 + 9 t^5$
Knot [10, 26]	$60 - 49 t + 28 t^2 - 10 t^3 + 4 t^4 - t^5$
Knot [10, 27]	$-252 + 229 t - 164 t^2 + 87 t^3 - 28 t^4 + 5 t^5$
Knot [10, 28]	$136 - 100 t + 36 t^2 - 8 t^3$
Knot [10, 29]	$-128 + 124 t - 104 t^2 + 52 t^3 - 12 t^4 + t^5$
Knot [10, 30]	$-440 + 345 t - 148 t^2 + 24 t^3$
Knot [10, 31]	$-12 + 9 t - 4 t^2$
Knot [10, 32]	$-96 + 78 t - 40 t^2 + 13 t^3 - 4 t^4 + t^5$
Knot [10, 33]	$0$
Knot [10, 34]	$68 - 52 t + 20 t^2 - 5 t^3$
Knot [10, 35]	$76 - 47 t + 12 t^2 - t^3$
Knot [10, 36]	$-264 + 208 t - 88 t^2 + 14 t^3$
Knot [10, 37]	$0$
Knot [10, 38]	$-336 + 270 t - 128 t^2 + 24 t^3$
Knot [10, 39]	$-280 + 263 t - 204 t^2 + 125 t^3 - 52 t^4 + 9 t^5$
Knot [10, 40]	$288 - 258 t + 176 t^2 - 89 t^3 + 28 t^4 - 5 t^5$

{152.032,	Knot [10, 41]	$-164 + 157 t - 120 t^2 + 54 t^3 - 12 t^4 + t^5$	}
	Knot [10, 42]	$-12 + 11 t - 8 t^2 + 2 t^3$	
	Knot [10, 43]	$0$	
	Knot [10, 44]	$-248 + 220 t - 140 t^2 + 56 t^3 - 12 t^4 + t^5$	
	Knot [10, 45]	$0$	
	Knot [10, 46]	$56 - 55 t + 52 t^2 - 43 t^3 + 34 t^4 - 21 t^5 + 12 t^6 - 3 t^7$	
	Knot [10, 47]	$64 - 68 t + 60 t^2 - 56 t^3 + 38 t^4 - 23 t^5 + 8 t^6 - 2 t^7$	
	Knot [10, 48]	$4 - 3 t + 2 t^3 - 2 t^4 + t^5$	
	Knot [10, 49]	$-392 + 372 t - 292 t^2 + 196 t^3 - 94 t^4 + 30 t^5$	
	Knot [10, 50]	$200 - 186 t + 150 t^2 - 94 t^3 + 44 t^4 - 9 t^5$	
	Knot [10, 51]	$212 - 194 t + 134 t^2 - 73 t^3 + 24 t^4 - 5 t^5$	
	Knot [10, 52]	$44 - 49 t + 50 t^2 - 37 t^3 + 16 t^4 - 3 t^5$	
	Knot [10, 53]	$-828 + 680 t - 346 t^2 + 93 t^3$	
	Knot [10, 54]	$16 - 21 t + 26 t^2 - 24 t^3 + 12 t^4 - 3 t^5$	
	Knot [10, 55]	$-596 + 488 t - 246 t^2 + 66 t^3$	
	Knot [10, 56]	$340 - 312 t + 234 t^2 - 133 t^3 + 52 t^4 - 9 t^5$	
	Knot [10, 57]	$340 - 300 t + 194 t^2 - 93 t^3 + 28 t^4 - 5 t^5$	
	Knot [10, 58]	$-140 + 94 t - 28 t^2 + 3 t^3$	
	Knot [10, 59]	$196 - 181 t + 128 t^2 - 55 t^3 + 12 t^4 - t^5$	
	Knot [10, 60]	$-176 + 122 t - 40 t^2 + 5 t^3$	
	Knot [10, 61]	$36 - 35 t + 36 t^2 - 27 t^3 + 20 t^4 - 7 t^5$	
	Knot [10, 62]	$88 - 89 t + 76 t^2 - 63 t^3 + 40 t^4 - 23 t^5 + 8 t^6 - 2 t^7$	
	Knot [10, 63]	$-496 + 416 t - 220 t^2 + 66 t^3$	
	Knot [10, 64]	$64 - 60 t + 52 t^2 - 37 t^3 + 24 t^4 - 11 t^5 + 4 t^6 - t^7$	
	Knot [10, 65]	$180 - 169 t + 124 t^2 - 71 t^3 + 24 t^4 - 5 t^5$	
	Knot [10, 66]	$-724 + 662 t - 480 t^2 + 279 t^3 - 112 t^4 + 30 t^5$	
	Knot [10, 67]	$-392 + 312 t - 140 t^2 + 24 t^3$	
	Knot [10, 68]	$-164 + 117 t - 40 t^2 + 8 t^3$	
	Knot [10, 69]	$476 - 397 t + 212 t^2 - 68 t^3 + 12 t^4 - t^5$	
	Knot [10, 70]	$152 - 146 t + 114 t^2 - 53 t^3 + 12 t^4 - t^5$	
	Knot [10, 71]	$4 - t - 2 t^2 + t^3$	
	Knot [10, 72]	$448 - 410 t + 298 t^2 - 167 t^3 + 60 t^4 - 9 t^5$	
	Knot [10, 73]	$-416 + 350 t - 194 t^2 + 65 t^3 - 12 t^4 + t^5$	
	Knot [10, 74]	$-360 + 290 t - 136 t^2 + 24 t^3$	
	Knot [10, 75]	$172 - 117 t + 36 t^2 - 4 t^3$	
	Knot [10, 76]	$272 - 245 t + 184 t^2 - 104 t^3 + 44 t^4 - 9 t^5$	
	Knot [10, 77]	$208 - 189 t + 132 t^2 - 71 t^3 + 24 t^4 - 5 t^5$	
	Knot [10, 78]	$-448 + 390 t - 244 t^2 + 105 t^3 - 24 t^4 + 2 t^5$	
	Knot [10, 79]	$0$	
	Knot [10, 80]	$-616 + 568 t - 426 t^2 + 260 t^3 - 112 t^4 + 30 t^5$	
	Knot [10, 81]	$0$	
	Knot [10, 82]	$-84 + 84 t - 78 t^2 + 64 t^3 - 42 t^4 + 19 t^5 - 6 t^6 + t^7$	
	Knot [10, 83]	$332 - 301 t + 214 t^2 - 110 t^3 + 34 t^4 - 5 t^5$	
	Knot [10, 84]	$424 - 373 t + 246 t^2 - 116 t^3 + 34 t^4 - 5 t^5$	
	Knot [10, 85]	$-140 + 138 t - 124 t^2 + 101 t^3 - 68 t^4 + 36 t^5 - 12 t^6 + 2 t^7$	
	Knot [10, 86]	$128 - 105 t + 58 t^2 - 21 t^3 + 6 t^4 - t^5$	
	Knot [10, 87]	$152 - 125 t + 66 t^2 - 23 t^3 + 6 t^4 - t^5$	
	Knot [10, 88]	$0$	
	Knot [10, 89]	$-596 + 495 t - 264 t^2 + 83 t^3 - 14 t^4 + t^5$	
	Knot [10, 90]	$112 - 93 t + 54 t^2 - 21 t^3 + 6 t^4 - t^5$	
	Knot [10, 91]	$4 - 3 t + 2 t^3 - 2 t^4 + t^5$	
	Knot [10, 92]	$696 - 622 t + 428 t^2 - 216 t^3 + 68 t^4 - 9 t^5$	

Knot [10, 93]	$-48 + 55t - 58t^2 + 43t^3 - 18t^4 + 3t^5$
Knot [10, 94]	$120 - 115t + 102t^2 - 76t^3 + 46t^4 - 20t^5 + 6t^6 - t^7$
Knot [10, 95]	$436 - 384t + 248t^2 - 114t^3 + 32t^4 - 5t^5$
Knot [10, 96]	$212 - 147t + 50t^2 - 7t^3$
Knot [10, 97]	$788 - 603t + 242t^2 - 37t^3$
Knot [10, 98]	$-564 + 501t - 348t^2 + 177t^3 - 60t^4 + 9t^5$
Knot [10, 99]	$0$
Knot [10, 100]	$-196 + 192t - 164t^2 + 128t^3 - 80t^4 + 39t^5 - 12t^6 + 2t^7$
Knot [10, 101]	$1148 - 942t + 480t^2 - 129t^3$
Knot [10, 102]	$108 - 89t + 50t^2 - 19t^3 + 6t^4 - t^5$
Knot [10, 103]	$-280 + 254t - 178t^2 + 93t^3 - 30t^4 + 5t^5$
Knot [10, 104]	$4 - 3t + 2t^3 - 2t^4 + t^5$
Knot [10, 105]	$332 - 292t + 184t^2 - 71t^3 + 14t^4 - t^5$
Knot [10, 106]	$140 - 134t + 114t^2 - 82t^3 + 48t^4 - 20t^5 + 6t^6 - t^7$
Knot [10, 107]	$-16 + 13t - 8t^2 + 2t^3$
Knot [10, 108]	$32 - 40t + 50t^2 - 41t^3 + 18t^4 - 3t^5$
Knot [10, 109]	$0$
Knot [10, 110]	$-236 + 219t - 160t^2 + 69t^3 - 14t^4 + t^5$
Knot [10, 111]	$480 - 436t + 316t^2 - 171t^3 + 60t^4 - 9t^5$
Knot [10, 112]	$-180 + 175t - 152t^2 + 115t^3 - 68t^4 + 29t^5 - 8t^6 + t^7$
Knot [10, 113]	$720 - 623t + 394t^2 - 167t^3 + 42t^4 - 5t^5$
Knot [10, 114]	$-168 + 140t - 78t^2 + 30t^3 - 8t^4 + t^5$
Knot [10, 115]	$0$
Knot [10, 116]	$-228 + 217t - 184t^2 + 132t^3 - 74t^4 + 30t^5 - 8t^6 + t^7$
Knot [10, 117]	$600 - 522t + 330t^2 - 144t^3 + 38t^4 - 5t^5$
Knot [10, 118]	$0$
Knot [10, 119]	$220 - 175t + 86t^2 - 26t^3 + 6t^4 - t^5$
Knot [10, 120]	$-1788 + 1433t - 692t^2 + 166t^3$
Knot [10, 121]	$-732 + 634t - 396t^2 + 167t^3 - 42t^4 + 5t^5$
Knot [10, 122]	$264 - 211t + 104t^2 - 34t^3 + 8t^4 - t^5$
Knot [10, 123]	$0$
Knot [10, 124]	$-6t - 4t^2 - 6t^4 - 4t^7$
Knot [10, 125]	$-4 + 3t - 2t^3 + 2t^4 - t^5$
Knot [10, 126]	$-20 + 22t - 12t^2 + 10t^3 - 2t^4 + t^5$
Knot [10, 127]	$-72 + 67t - 52t^2 + 32t^3 - 14t^4 + 2t^5$
Knot [10, 128]	$12 - 9t - 10t^2 - 3t^3 + 12t^4 - 13t^5$
Knot [10, 129]	$-20 + 14t - 2t^2 - t^3$
Knot [10, 130]	$-24 + 19t - 2t^2 + t^3$
Knot [10, 131]	$-112 + 87t - 38t^2 + 5t^3$
Knot [10, 132]	$-4 + 5t + 2t^2$
Knot [10, 133]	$-48 + 37t - 14t^2 + t^3$
Knot [10, 134]	$40 - 41t + 30t^2 - 33t^3 + 24t^4 - 13t^5$
Knot [10, 135]	$-24 + 18t - 6t^2 + t^3$
Knot [10, 136]	$-4 - 2t + 4t^2 - t^3$
Knot [10, 137]	$-44 + 24t - 4t^2$
Knot [10, 138]	$8 - 11t + 24t^2 - 22t^3 + 8t^4 - t^5$
Knot [10, 139]	$12 - 16t - 4t^2 + 5t^3 - 12t^4 - 4t^7$
Knot [10, 140]	$-8 + 8t$
Knot [10, 141]	$-20 + 16t - 8t^2 + t^3$
Knot [10, 142]	$12 - 17t + 4t^2 - 13t^3 + 12t^4 - 13t^5$
Knot [10, 143]	$-48 + 45t - 28t^2 + 15t^3 - 4t^4 + t^5$
Knot [10, 144]	$0$

Knot[10, 144]	$-96 + 80 t - 44 t^2 + 10 t^3$
Knot[10, 145]	$-8 + 6 t + 8 t^2 + 2 t^3$
Knot[10, 146]	$-28 + 21 t - 8 t^2 + t^3$
Knot[10, 147]	$12 - 15 t + 12 t^2 - 3 t^3$
Knot[10, 148]	$-68 + 62 t - 36 t^2 + 18 t^3 - 4 t^4 + t^5$
Knot[10, 149]	$-164 + 149 t - 104 t^2 + 55 t^3 - 18 t^4 + 2 t^5$
Knot[10, 150]	$44 - 45 t + 38 t^2 - 26 t^3 + 12 t^4 - 2 t^5$
Knot[10, 151]	$72 - 66 t + 42 t^2 - 21 t^3 + 6 t^4 - t^5$
Knot[10, 152]	$-52 + 45 t - 12 t^2 - 7 t^3 + 18 t^4 - 7 t^5 + 4 t^7$
Knot[10, 153]	$-t + 2 t^2 + t^3 - 2 t^4 + t^5$
Knot[10, 154]	$68 - 47 t + 13 t^3 - 6 t^4 - 3 t^5$
Knot[10, 155]	$28 - 22 t + 12 t^2 - 2 t^3$
Knot[10, 156]	$-32 + 33 t - 30 t^2 + 19 t^3 - 6 t^4 + t^5$
Knot[10, 157]	$240 - 218 t + 148 t^2 - 78 t^3 + 22 t^4 - 2 t^5$
Knot[10, 158]	$12 - 7 t + 2 t^2$
Knot[10, 159]	$-112 + 98 t - 60 t^2 + 26 t^3 - 6 t^4 + t^5$
Knot[10, 160]	$12 - 16 t + 14 t^2 - 20 t^3 + 12 t^4 - 2 t^5$
Knot[10, 161]	$-12 + 14 t + 4 t^2 - 3 t^3 + 6 t^4 + 3 t^5$
Knot[10, 162]	$-68 + 58 t - 38 t^2 + 10 t^3$
Knot[10, 163]	$96 - 89 t + 62 t^2 - 30 t^3 + 8 t^4 - t^5$
Knot[10, 164]	$-40 + 29 t - 10 t^2 + t^3$
Knot[10, 165]	$196 - 146 t + 50 t^2 - 5 t^3$

ListPlot[{Log[Crossings[#]], Log[Timing[ρRVK[#]]][[1]]} & /@ TorusKnots[13]]



{#[[1]], #[[2]], Normal[Series[Alexander[#][t], {t, Infinity, 0}]], ρRVK[#]} & /@ AllKnots[{3, 6}]

{ {3, 1, -1 + t, t}, {4, 1, 3 - t, 0}, {5, 1, 1 - t + t^2, 3 t + 2 t^3}, {5, 2, -3 + 2 t, -4 + 5 t}, {6, 1, 5 - 2 t, -4 + t}, {6, 2, -3 + 3 t - t^2, -4 + 4 t - 4 t^2 + t^3}, {6, 3, 5 - 3 t + t^2, 0} }

```

KnotLine[K_] := StringReplace[
  "\\includegraphics[width=0.5cm, trim=0 0 0 -1.5cm]{RolfesenImages/Q_P.png}
    &{$Q_{P}$}&{$A$}&{$Z$}\\ \\hline \\n",
  {"Q" → ToString[K[[1]]],
   "P" → ToString[K[[2]]],
   "A" → ToString@TeXForm[Normal[Series[Alexander[K][t], {t, Infinity, 0}]]],
   "Z" → ToString@TeXForm[ρRVK[K]]
  }
]

```

```

WriteString["Tabbb.txt", StringJoin[KnotLine /@ AllKnots[{3, 10}]] ]

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Directory[]

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/home/roland

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