

Pensieve header: RVK and Z. Continues pensieve://Projects/SL2Portfolio2/.

RVK and Z

RVK, rot, Z from 2016-09/OneSmidgen.nb. See also in AP/Projects/SL2Invariant/.

Some details of the code below are at <http://drorbn.net/bbs/show?shot=Dror-160920-151350.jpg>.

In[*]:=

```
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] := PPRVK@Module[{n, xs, x, rots, front = {0}, k},
  n = Length@pd; rots = Table[0, {2 n}]];
  xs = Cases[pd, x_X => { Xp[x[[4]], x[[1]] PositiveQ@x
    { Xm[x[[2]], x[[1]] True }
  ];
  For[k = 0, k < 2 n, ++k, If[k == 0 ∨ FreeQ[front, -k],
    front = Flatten@Replace[front, k → (xs /. {
      Xp[k + 1, L_] | Xm[L_, k + 1] => {L, k + 1, 1 - L},
      Xp[L_, k + 1] | Xm[k + 1, L_] => (++rots[[L];
        {1 - L, k + 1, L}),
      _Xp | _Xm => {}
    }), {1}],
    Cases[front, k | -k] /. {k, -k} => --rots[[k + 1]];
  ];
  RVK[xs, rots] ];
RVK[K_] := RVK[PD[K]]];
```

```
rot[i_, 0] := dηi;
rot[i_, n_] := Module[{j},
  rot[i, n] = If[n > 0, rot[i, n - 1] kCj, rot[i, n + 1]  $\overline{kC}$ j] // kmi,j→i];
```

```

Z[K_] := Z[RVK@K];
Z[rvk_RVK] := Monitor[PP"z"@Module[{todo, rots,  $\xi$ , done, st, cx,  $\xi_1$ , i, j, k},
  {todo, rots} = List@@rvk;
   $\xi$  = d $\eta_0$ ;
  done = {0};
  st = Range[0, 2 Length[todo] + 1];
  While[{} != ($M = todo),
    cx =
      RandomChoice@MaximalBy[todo, Length[done  $\cap$  {#[[1]], #[[2]], #[[1]] - 1, #[[2]] - 1}] &];
    {i, j} = List@@cx;
     $\xi_1$  = (cx /. {_Xp  $\rightarrow$  kRi,j  $\overline{kKink_0}$ , _Xm  $\rightarrow$  k $\overline{R_{i,j}}$  kKink0}) // kmj,0 $\rightarrow$ j;
    Do[ $\xi_1$  = (rot[0, rots[[k]]]  $\xi_1$ ) // km0,k $\rightarrow$ k, {k, {i, j}}];
     $\xi$  *=  $\xi_1$ ;
    Do[
      If[MemberQ[done, k],  $\xi$  =  $\xi$  // kmst[[k+1],k+1 $\rightarrow$ st[[k+1]]; st = st /. st[[k+2]]  $\rightarrow$  st[[k+1]],
        {k, {i, i-1, j, j-1}}];
      done = done  $\cup$  {i-1, i, j-1, j};
      todo = DeleteCases[todo, cx]
    ];
    CF /@ ( $\xi$  /. {x0  $\rightarrow$  x, y0  $\rightarrow$  y, a0  $\rightarrow$  a})
  ], $M]

```