

Pensieve Header: Computing rotation numbers. Based on Common.nb at pensieve://Classes/21-1350-KnotTheory/.

```
Print["Loading Rot.m from
      http://drorbn.net/AP/Talks/Bonn-2505 to compute rotation numbers."]
```

```
Rot::usage =
  "Rot[K] where K is any n-crossing knot presentation returns {Cs,  $\varphi$ }, where Cs
    is a length n list of crossings as triples {s,i,j}
    and  $\varphi$  is a length 2n list of rotation numbers.";
```

```
In[*]:= PD[epd_EPD] := PD@@epd /. {Xi,j => X[j, i + 1, j + 1, i],  $\bar{X}_{i,j}$  => X[j, i, j + 1, i + 1]}
```

```
Rot[pd_PD] := Module[{n, xs, x, rots, Xp, Xm, front = {1}, 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 = 1, k <= 2 n, ++k,
    If[FreeQ[front, -k],
      front = Flatten@Replace[front, k -> {xs /. {
        Xp[k, l_] | Xm[l_, k] => {l + 1, k + 1, -l},
        Xp[l_, k] | Xm[k, l_] => {++rots[[l]]; {-l, k + 1, l + 1}},
        _Xp | _Xm => {}
      }}, {1}],
      Cases[front, k | -k] /. {k, -k} => --rots[[k];
  ];
  {xs /. {Xp[i_, j_] => {+1, i, j}, Xm[i_, j_] => {-1, i, j}}, rots}];
Rot[K_] := Rot[PD[K]];
```

```
In[*]:= Features[K_] := Module[{Cs,  $\varphi$ s,  $\varphi$ , k = 0, nk, s, i, j, res = 1},
  {Cs,  $\varphi$ s} = Rot[K];
  nk = Table[If[ $\varphi$  == 0, ++k, res * C++k[ $\varphi$ ]; ++k], { $\varphi$ ,  $\varphi$ s}];
  Features[k, res * Times@@Cases[Cs, {s_, i_, j_] => Xnk[[i]], nk[[j]][s]]]
]
```