

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

```
Print["Loading Rot.m from
      http://drorbn.net/AP/Projects/HigherRank to compute rotation numbers."]
```

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

```
In[*]:= PD[epd_EPD] := PD@@epd /. {Xi,j => X[j, i+1, j+1, i], X̄i,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, φs, φ, k = 0, nk, s, i, j, res = 1},
  {Cs, φs} = Rot[K];
  nk = Table[If[φ == 0, ++k, res * C++k[φ]; ++k], {φ, φs}];
  Features[k, res * Times@@Cases[Cs, {s_, i_, j_} => Xnk[[i]], nk[[j]][s]]]
]
```