

ReidemeisterThree@k_MDT := ReidemeisterThree@k =

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Block[{b, f, n = Length@k,
  p = List@@Build@k //
    ( $\#^T \cup (\text{Abs@Reverse@}\#\text{Sign@}\#)^T$ )T[[2]] &,
  v, y = {}},
  b = Abs@p // #Mod[#[[1]] + {1, -1}, 2 n, 1] &;
  Do[f = Mod[Abs@p[[i]] + {1, -1}, 2 n, 1]
    // If[OddQ@i, Abs@p[[#]], #] &;
  Do[If[{c, i - 1, i}
    // Total[Sign@p[[#]]]2 == 1  $\bigwedge$ 
      MemberQ[(Abs@p[[#]]  $\cup$  #) [[2 ;; 3]], i] &,
    (*The third Reidemeister move can
      be made with the given settings.*)
    v = p[{Abs@p[[c]], Abs@p[[i - Mod[i, 2]]],
      i - Mod[i + 1, 2]]] / 2;
    If[DuplicateFreeQ@v,
      AppendTo[y, k /.
        (v[[#1]]  $\rightarrow$  -Abs@v[[#2]] Sign@v[[#3]] &@@@
          {{1, 2, 3}, {2, 3, 1}, {3, 1, 2}})]],
    {c, b  $\cap$  f}];
  b = f, {i, 2, 2 n}];
KnotSort[Minimal /@ y  $\cup$  {}]]];
```