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PassMapping[v_List, l_List, p_List, c_List,
  n_Integer, a_Integer, i_Integer] :=
PassMapping[v, l, p, c, n, a, i] =
If[Length[v ∩ l[[;; 2]]] == 1,
  (*Pass ends connect to
  opposite sides of knot.*)
  (*Value a gets mapped to.*)
  Mod[If[MemberQ[v ∪ Join@@c, a],
    If[MemberQ[c[[1]], a], a +
      If[Mod[Abs@p[[1][1]] - i, 2 n] > 1, 1, -1],
    If[MemberQ[c[[2]], a], a + If[
      Mod[Abs@p[[1][3]] - i, 2 n] > 1, 1, -1],
      (1[[{2, 1, 4, 3}]] + {-1, 1, -1, 1})
      [Position[1, If[OddQ[1[[1]] + 1[[2]]],
        Total@v - a, a]] [[1, 1]]]],
    a], 2 n, 1]
  (*New sign of a.*)
  If[MemberQ[v ∪ Join@@c, a] ∨ EvenQ@a,
    If[Mod[a - i, 2 n] ≤ 1 ∨ OddQ@a ∧
      ¬ MemberQ[1, a], -Sign@p[[a], 1],
    Sign@p[[a]],
  (*Pass ends
  connect to same side of knot.*)
  (*Value a gets mapped to.*)
  Mod[If[MemberQ[v, a], SortBy[
    Delete[1, FirstPosition[1, #] & /@ v],
    Mod[#, 2] &] [[Mod[a, 2] + 1]],
    a + If[MemberQ[Join@@c, a], 0,
      If[MemberQ[v, 1[[Ordering[Mod[a - 1, 2
        n, 1]] [[1]]]], -1, 1]]], 2 n, 1]
  (*Sign of a.*)
  If[OddQ@a, Sign@p[[a]]
    If[MemberQ[v ∪ Join@@c, a], 1, -1], 1];

```