

PassReducible@ k gives True if the knot k , which is given in modified DT form, is reducible with a 2,1-pass move or a 3,2-pass move, and False otherwise.

PassReducible@k_MDT := PassReducible@k =

Block[{1, n = Length@k, p = List @@ Build@k

// (#^T ∪ (Abs@Reverse@#

Sign /@ List @@ Build[MDT @@ (-List @@ k)])^T)^T[[2]] &,

v = True},

Do[

If[(Sign@p[[Mod[i + j (Range@o - 1), 2 n, 1]]] ∪ {})² ==
{1},

If[o == 3, Goto@1];

Do[If[Total@Mod[e, 2] == 2, If[(Mod[e, 2 n, e[[1]]

// Partition[#, 2] &

// Range @@@ # &)] [;;, 2 ;; -2]]

// Mod[#, 2 n, 1] &

// Union @@ # &

// # == Abs@p[[#]] ∪ {} &, Goto@1]],

{e,

Select[Table[SortBy[{c, i} ∪ Abs@

p[[Mod[{i, i + j}, 2 n, 1]]],

Mod[#, 2 n, i] &], {c, 2 n}],

Length@# == 4 &]^T[[

If[j == 1, {2, 3, 4, 1}, ;;]]^T]]],

{o, {3, 2}}, {i, 2 n}, {j, {1, -1}}];

v = False;

Label@1;

v];