

Homework 3

Knot Theory - Atkinson

Due on Friday, February 9.

Remember to follow the guidelines given in the first assignment.

- (1) Adams, exercise 2.3.
- (2) Adams, exercise 2.5.
- (3) Adams, exercise 2.8.
- (4) Let D be a knot projection with DT notation as follows:

6 8 10 2 4 14 28 22 20 26 24 16 18 30 12

- (a) Using permutation notation as discussed in class, show that D is a composite projection by looking only at the DT sequence (A version of the discussion in class appears in “The first 1,701,936 knots” on page 39, left column, second paragraph).
 - (b) Sketch one of the possibilities for D and use your sketch to show that D represents a knot that is actually a composition of *three* prime knots.
 - (c) Describe how you could have detected the fact that D represented a composite of three diagrams from the DT sequence alone. Create a new example of a composite knot with at least three prime factors, compute its DT sequence, and show whether or not your method still works.
- (5) (A tiny amount of research) The tabulation of Hoste, Thistlethwaite, and Weeks is a bit out of date. Investigate the state of the art of knot tabulation and enumeration. Find at least two ways that the knot tabulation has been extended since 1998. Briefly describe the results you find and include references to the sources of your information.

In addition to your favorite search engine, a useful tool is MathSciNet. MathSciNet consists of reviews of an extremely large body of mathematical literature. The reviews are linked via references. To see what I mean, try finding the paper by Hoste, Thistlethwaite, and Weeks. Searching in the “anywhere” field for “1,701,936” seems to do it. After accessing the review, click the “From references” link to see all indexed papers that have cited the given paper. You can find it here: <http://www.ams.org.ezproxy.morris.umn.edu/mathscinet/>.