Problem set 1- due September 16. Write clear and complete solutions for each problem. You may send them to me via email (cui177 at purdue dot edu, preferred method) or in class. Please make your writing clearly legible.

1. Use any method you like to compute the un-normalized un-framed Jones polynomial for the Hopf link (oriented as in Figure 1) and the left-handed trefoil knot (see Figure 2).

2. For an oriented un-framed link L, let $\mathrm{mirr}(L)$ be the mirror image of L. Show that for the un-normalized Jones polynomial, $J(L; A) = J(\mathrm{mirr}(L); A^{-1})$. Use this result to give the Jones polynomial for the right-handed trefoil knot (see Figure 2), and conclude that the Jones polynomial distinguishes mirror image.

3. Use the inductive formula given in class, express the third Jones-Wenzl projector $p_3 \in E_3$ as a linear combination of simple (3,3) tangle diagrams.

4. Recall the trace defined on the Temperley-Lieb algebras. Compute the trace for the Jones-Wenzl projector $p_n \in E_n$ whenever it is defined. For which p_n is the trace zero? This may depend on A.
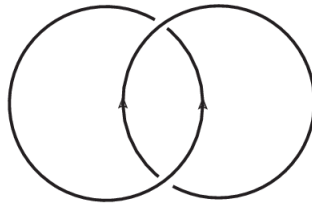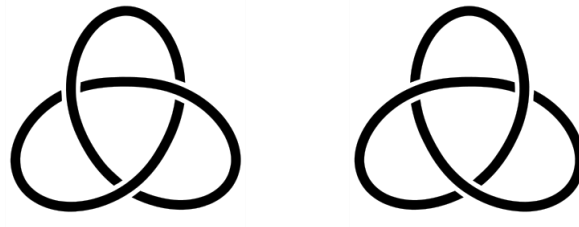

Figure 1: Hopf link

Figure 2: left-handed trefoil knot (Left) and right-handed trefoil knot (Right)