HOMEWORK 4

Problem 1. Compute the Jones polynomial of the two-component unlink using only the three axioms of the Jones polynomial.

Problem 2. Let L be a link and U be the unknot. Compute the Jones polynomial of $L \cup U$ in terms of the Jones polynomial of L.

Problem 3. Compute the Jones polynomial of the Hopf link using the axioms and the result of problem 1.

Problem 4. Compute the Jones polynomial of the (left or right) trefoil using the result of the previous problem.

Problem 5. Find a formula for the Jones polynomial of the connected sum of two diagrams. (Start with finding a formula for the bracket of the connected sum of two diagrams).

Problem 6. Find a formula for the Jones polynomial of the disjoint union of two diagrams. (Start with finding a formula for the bracket of the disjoint union).

Problem 7. Compute the Jones polynomial of the knot 5_2 in the following way: First, find a sequence of crossing changes that transform the standard diagram of 5_2 into a diagram of unknot. Reversing this sequence of crossing changes, you get a way to obtain 5_2 from the unknot. Then, use the value of the Jones polynomial of the unknot and the skein relation of the Jones polynomial applied at each step of the sequence to get the Jones polynomial of the unknot.