

## Math 9024 Homework 4

Due Thursday, 2/26/15

1. Do Exercise 4.10 of Purcell's notes.
2. Read through Section 5.1.1 of Purcell's notes, which works out a subdivision of the polyhedral decomposition of the  $6_3$  knot complement into ideal tetrahedra. Then, write down the edge gluing equations for the triangulation of Figure 5.9, with one variable per tetrahedron, in polynomial form.
3. For the triangulation of Figure 5.9, work out enough of the vertex link to write down a completeness equation for the  $6_3$  knot complement. (This is easiest if you develop the tetrahedra to go around the meridian.)
4. (**extra credit**) The solution set to the equations in problem 2 is a one (complex) dimensional algebraic variety in  $\mathbb{C}^5$ . Prove that this variety is non-empty, i.e. the equations have at least one solution.