MATH 285Z Assignment 1

This assignment is due at 11:59 pm on Wednesday, Feb. 21, 2024.

Problem 1: Let M be the genus 2 handlebody (i.e. the inside region of the embedding of the genus 2 surface in $\mathbb{R}^3$). Find a set of sutures γ so that (M, γ) is a balanced taut sutured manifold. Prove that your construction is balanced and taut. (Hint: for tautness, you may either use the definition or the following proposition: if the sutured manifold after the surface decomposition is taut, then the original one is also taut.)

Problem 2: Suppose K is a knot inside S^3 and $S^3_{p/q}(K)$ is the p/q-surgery on K. Prove that

$$H_1(S^3_{p/q}(K); \mathbb{Z}) \cong \mathbb{Z}/|p|.$$