

These exercises are mainly taken from the third week's lectures. Please do let me know if any of the problems are unclear or have typos.

Exercise 3.1. Compute the determinant of the 5_1 knot (the cinquefoil) and the twist knots. Notice that the first two twist knots are the trefoil and the figure eight.

Exercise 3.2. With notation as in the proof of Lemma 6.2: show that type 1 operations can be obtained from three operations of type 2.

Exercise 3.3. Let $T(2, 4)$ be the $(2, 4)$ -torus link. Let W be the Whitehead link. Show that $\det(T(2, 4)) = 4$ while $\det(W) = 8$.

Exercise 3.4. Show that $P = P(-2, 3, 5)$ has determinant equal to one.

Exercise 3.5. Prove Proposition 6.9: the coloring group is an isotopy invariant. To do this show that if two diagrams D and D' differ by a single Reidemeister move then $\text{Col}(D)$ and $\text{Col}(D')$ are isomorphic.

Exercise 3.6. Reproduce the direct computation of $\text{Col}(L)$, where L is the link shown in Figure 17, as performed in class.