Research Prep 2 Materials

Topology, Knot Theory, and Manifolds

July 21, 2025

Exercise 1.1. Compute the Khovanov homology of the right-handed trefoil knot. (Don't worry about grading's just compute the total rank, i.e. the number of generators that are left after canceling all differentials.)

Exercise 1.2. In class we defined a new chain complex that we assign to a diagram D, which we called $C_{1+1}(D)$. This was defined in terms of labeling the diagrams D_v with 1s and 2s, where D_v was a complete oriented resolution (i.e. a resolution where each crossing has been replaced with the oriented smoothing or the singularization).

Find a relationship between $C_{1+1}(D)$ and the Khovanov complex $C_{1+1}(D)$.