

Lecture 7. Exercises

June 5, 2022

1 Easy Exercises

1. Prove that the Conway/Alexander polynomial does not detect knot mutation.
2. Prove that the Conway/Alexander polynomial does not detect knot invertibility.

2 Exercises

1. Show that all definitions of the Alexander polynomial coincide up to multiplication by $\pm t^n$.
2. Prove that $M[A, B]$ does not depend on the choice of B .
3. Calculate the genera of knots 3_1 and 4_1 .
4. Prove that for an n -component link all coefficients c_{2k+1} of the Conway polynomial are trivial if n is odd, and all coefficients c_{2k} are trivial if n is even.
5. Prove that the span of the Alexander polynomial for a link having n crossings does not exceed $(n - 1)$.
Consequently, if the span of an n -crossing link equals $(n - 1)$ then it is minimal w.r.t. crossing number.

3 Hard exercise

1. Construct knots with trivial Alexander polynomial. You can mention the answer (Kinoshita-Terasaka knot) which can be found: [here](#)