A Short Course On "**Fast Computations in Knot Theory**"

Dror Bar-Natan at Tsuda University, June 29 – July 10, 2023.

Tentative Hourly Plan.

Thursday, June 29 (2.5+1.5 hours):

- A quick introduction to knot theory.
- The Jones polynomial.
- Computing the Jones polynomial.

Friday June 30 (2.5 hours):

- A half is better than a whole: Computing the Jones polynomial much faster.
- Cows are better than numbers! Complexes are not so bad either.

Monday July 3 (2.5+1.5 hours):

- Khovanov homology: The definition.
- Homology of spaces.
- How to prove things about complexes?

Wednesday July 5 (2.5 hours):

- Khovanov homology: Invariance.
- Khovanov homology: Computation.

Friday July 7 (2.5+1.5 hours):

- Categories and complexes in a category.
- Homotopy in topology and in algebra.
- Khovanov homology for tangles.

Monday July 10 (2.5 hours):

- Formal Gaussian elimination and delooping.
- FastKh / a meta-half is better than a meta-whole.