A Short Course On “**Fast Computations in Knot Theory**”

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

**Global Preps.**

* Make sure that I can work the projector in room 7311.
* Set up a website.
* Confirm availability of Mathematica.
* Schedule HW.

**Tentative Hourly Plan.**

**Thursday** June 29 (2.5+1.5 hours):

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

**HW.** Following my last UofT class, plus some computations, due on Monday.

**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+1.5 hours):

* Khovanov homology: Invariance.
* Khovanov homology: Computation.
* Categories and complexes in a category.

**HW.** Some computational KH homework, due on Monday.

**Friday** July 7 (2.5 hours):

* 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.

**HW.** ???, due on Thursday.