

Proposed graduate course for 2016-17: Algebraic Knot Theory: Polynomial Knot Polynomials

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MAT 1350 Algebraic Knot Theory: Polynomial Knot Polynomials

Abstract: There are knot polynomials aplenty: the Alexander polynomial, the Jones, the HOMFLY, the MVA, the Links-Gould, the Kauffman, the A, the super-A, coloured versions of many of the above, and many more. But most of these are very hard to compute; with the exception of Alexander, it takes exponential or super-exponential time.

In my class I will explain why poly-computable knot and tangle invariants exist (beyond the Alexander), why they are highly desired, and why they are hard to actually find in practice. The key words that will appear are "Alexander", "meta-groups", "universal finite type invariants", "2-knots", "virtual knots", "(free) Lie algebras", "quantization of bi-algebras", and "Feynman diagrams".

The course is intended for students who have already completed the core courses in algebra and topology, or their equivalents.