New Constructions of Virtual Knot Polynomials

Abstract:

Virtual Knot Theory is an extension of classical knot theory, where we also consider knots “knotted around” various surfaces. One of the main problems is finding ways to distinguish classical and virtual knots (between and amongst the two groups). In this talk we define a virtual knot polynomial, the Wriggle Polynomial, using virtual linking numbers. The Wriggle Polynomial is equivalent to the Affine Index Polynomial, which is defined in terms of an integer labeling system of a virtual knot diagram. The equality of the definitions is not immediately obvious (one is geometric and one is combinatorial). Interesting applications of this polynomial to Vassiliev Invariants, Mutant Knots, and the Cosmetic Crossing Change Conjecture are discussed. No knowledge of knot theory or virtual knot theory is assumed for the talk, and the first 15 minutes should serve as a short introduction.