

DREXEL ANALYSIS SEMINAR

May 19, 2023

12-1 PM, Korman 245

**Speaker:** Juriij Volčič (Drexel)

**Title:** State polynomials: positivity and applications

**Abstract:** State polynomials are polynomial expressions in operator variables and formal states of their products. This talk addresses state polynomials whose evaluations on states and tuples of operators on a Hilbert space are positive. The most well-known occurrence of such a positive state polynomial in disguise is the Cauchy-Schwarz inequality. Much more recently, positive state polynomials emerged as nonlinear Bell inequalities for quantum networks. The talk presents the state polynomial analog of Hilbert's 17th problem, and an algebraic certificate for constrained positivity. The latter is used to design a scheme for state polynomial optimization, which resolves a few questions from quantum information theory.