TEXAS STATE UNIVERSITY

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Discrete Mathematics Seminar

Time: Friday, September 20, 2019, 2:15-3:15 PM
Room: 330 Derrick Hall
Title: A Survey of Oriented Incidence and Applications to Quantifying Status, Bias, and Inequity
Speaker: Dr. Lucas Rusnak, Department of Mathematics, Texas State University

Abstract:

Signed graphs and balance theory have become the center of sentiment network analysis, reinforcement learning models, and defining coherency in AI decision making. Signed graphs represent a generalization of Heider theory and the Abelson-Rosenberg model of attitudinal cognition used in adaptive learning and education models.

In this talk I will briefly survey how graph theory generalizes to signed graphs and again to oriented hypergraphs. We will discuss what is gained and what is lost at each level of abstraction; and through these generalizations we observe that (commensurable) combinatorial matrix theory and representable matroids can be studied by their local signed graphic structure.

I will then introduce a portion of a new patent-pending combinatorial bootstrapping process and node-rank algorithm developed with Jelena Tesic (CS). We will examine (1a) the efficacy of detecting bias and promotional inequity in a known promotional network, (1b) identify variables strongly correlated to bias drift in that promotional network, (2a) examine the reliability of doctor/patient diagnosis in adolescent cognitive development, (2b) introduce a diagnostic hierarchy and discuss related symptomology, and (3) discuss future applications.