

Discrete Mathematics Seminar

Time: Friday, 6 November 2015, 2:00-3:00 PM
Room: 237 Derrick Hall
Title: A New Interpretation of the Matrix Tree Theorem Using Weak Walk
Contributors and Circle Activation
Speaker: Ellen Robinson, Undergraduate, Texas State University

Abstract:

We look at an alternate proof of the usual results of the Matrix Tree Theorem by shifting the focus to the oriented incidences. We begin by examining the weak walk contributors from the determinant of the Laplacian matrix of oriented simple graphs and classify them according to similar circle structures attained through circle activation. The members of each contribution class form an alternating signed Boolean lattice in which all members cancel. We restrict our contributors to those corresponding to a given cofactor L_{ij} and demonstrate that those contributors that no longer cancel are in one-to-one correspondence with the spanning trees of the graph. These results allow for possible extension into examining tree counts in signed graphs and oriented hypergraphs.