TEXAS STATE UNIVERSITY

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# Discrete Mathematics Seminar

Time: Friday, April 22, 2016, 2:15 --3:15 PM
Room: 237 Derrick Hall
Title: Sign variation, the Grassmannian, and total positivity
Speaker: Steven Karp, Ph. D. Student, UC-Berkeley

Abstract:

The totally nonnegative Grassmannian is the set of k-dimensional subspaces of $R^n$ whose nonzero Pluecker coordinates all have the same sign. Gantmakher and Krein (1950) showed that a k-dimensional subspace is totally nonnegative iff every vector in it, when viewed as a sequence of n numbers and ignoring any zeros, changes sign at most k-1 times. I will present a generalization of this result, which characterizes when the vectors in a subspace change sign at most m times in terms of sign changes of certain sequences of Pluecker coordinates. I will also discuss an application to the problem of defining amplituhedra and Grassmann polytopes, which appeared recently in the study of scattering amplitudes in theoretical physics.