

DREXEL ANALYSIS SEMINAR

January 18, 2013

Speaker: Luke Oeding (UC Berkeley)

Title: Relations among principal minors.

Abstract: A principal minor of a matrix is the determinant of a submatrix centered about the main diagonal. A basic linear algebra question asks to what extent is it possible to prescribe the principal minors of a matrix. The algebraic problem is to find defining equations for the associated algebraic variety. In particular, knowing such equations would provide a test for whether a given list of numbers can be the principal minors of a matrix.

I will explain a solution to this problem in the case of symmetric matrices, answering a conjecture of Holtz and Sturmfels. Then I will explain the notion of “exclusive rank” and how it relates principal minors to classically studied algebraic varieties such as the Segre variety and its tangential variety, answering a conjecture of Landsberg and Weyman. Finally I will discuss new work in the case that the principal minors of equal size are required to have the same value.