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Liam Solus* (liam.solus@uky.edu), **Caroline Uhler** and **Ruriko Yoshida**. *A Polyhedral Description of Extremal PSD Matrices for Certain Graphs.*

Given a graph G on p vertices we consider the closure of the cone of concentration matrices associated to G , i.e. the cone of all $p \times p$ positive semidefinite matrices with zeros in entries corresponding to the nonedges of G . Due to its applications in PD-completion problems and maximum-likelihood estimation, the geometry of this cone is of general interest. A natural pursuit in this geometric investigation is to characterize the possible ranks of the extremal rays of this cone. Two other well-studied convex bodies associated to G are the cut polytope and its positive semidefinite relaxation, the elliptope of G . Via an application of standard spectrahedral duality we will see that the dual to the elliptope of G is the trace two affine section of the cone of concentration matrices. Using the geometric relationship between these four convex bodies we will see that, in the case of graphs with no K_5 minors, extremal matrices of rank b in the cone of concentration matrices are given by the constants b where $v^T x = b$ is a facet-supporting hyperplane of the cut polytope of G . In the special case of series-parallel graphs we see that all extremal ranks are given in this fashion. Time permitting, we will discuss the more general implications. (Received July 28, 2015)