
DAVID WEHLAU, Royal Military College of Canada

Horn's Conjecture, The Littlewood-Richardson Cone and Permutations

Horn conjecture's deals with the following problem: If A and B are Hermitian matrices, how are the eigenvalues of $A + B$ constrained by the eigenvalues of A and B ? In 1962, Alfred Horn conjectured a beautiful answer to this question. In the late 1990's, A. Klyachko and Knutson-Tao independently proved Horn's conjecture.

Horn's conjecture has surprising and very important connections with several areas of mathematics, including the Schubert calculus, representations of Lie Groups, and quiver theory. The space of eigenvalues of A , B and $A + B$ forms a real polyhedral cone, known as the Littlewood-Richardson Cone. Understanding the geometry of the Littlewood-Richardson Cone, yields important information.

We can describe the generating rays and many other faces of this cone in terms of inversion sets for elements of the symmetric group. I will describe this combinatorial problem, our solution and a few of the consequences.