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Horn inequalities for singular values of products of operators

Abstract

Consider Hermitian matices A, B, C such that $A + B = C$. Let $\{\lambda_j(A)\}$, $\{\lambda_j(B)\}$, and $\{\lambda_j(C)\}$ be sequences of eigenvalues of A, B, and C counting multiplicity, arranged in decreasing order. In 1962, A. Horn conjectured that the relations of $\{\lambda_j(A)\}$, $\{\lambda_j(B)\}$, and $\{\lambda_j(C)\}$ can be characterized by a set of inequalities defined inductively. This conjecture was proved true by Klyachko and Knutson-Tao in the late 1990s. A related question, the multiplicative Horn problem, asks to describe the possible singular values of AB when the singular values of A and B are given. This problem is fully solved in the case where A and B are invertible matrices as Klyachko showed that it is equivalent to the additive problem after taking logarithms. In this talk we will discuss the case when A and B are not necessarily invertible and its generalization to the von Neumann algebra setting. This is joint work with H. Bercovici, B. Collins, and K. Dykema.

Talk time: 7/21/2016 4:00PM— 7/21/2016 4:20PM
Talk location: Cupples I Room 115

Special Session: Function spaces. Organized by J. McCarthy.