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Title: On sums of Hermitian operators in finite von Neumann algebras
Abstract: Given Hermitian $n \times n$ matrices A and B, whose eigenvalues (and multiplicities) are known, what can the eigenvalues of $A + B$ be? In 1962, A. Horn conjectured an answer, in terms of eigenvalue inequalities known as Horn inequalities. His conjecture was proved less than a decade ago due to work of Klyachko, Knutson and Tao. We consider the analogous question in finite von Neumann algebras, and prove that Horn inequalities (appropriately recast) hold in all finite von Neumann algebras. The classical method of proving a Horn inequality involves proving the existence of a projection satisfying certain properties with respect to three arbitrary flags. In order to do so, and building on ideas of Knutson, Tao and Woodward, we found methods of constructing these projections in a II_1–factor. These work also in the finite dimensional situation and give a new and constructive proof. This is joint work with H. Bercovici, B. Collins, W.S. Li and D. Timotin.

In work with B. Collins, Connes's embedding problem is shown to be equivalent to a version of the above question about the distribution of sums of Hermitian elements in finite von Neumann algebras, but with matrix coefficients