

Extending non-commutative Schatten norms to product spaces

Christopher King and Nilufer Koldan

The Schatten norm is the non-commutative analog of the Hölder l^p -norm. It is defined on the algebra of $n \times n$ complex-valued matrices for any n , and shares many properties of the classical norm, including duality, Hölder's inequality and monotonicity. In this talk we will present some basic properties of the Schatten norm, and then explore the question of extending this to a non-commutative analog of the $l^p(l^q)$ -norm on a product of matrix algebras. As it turns out there are two somewhat natural ways of extending the norm. One relies on ideas which arose in the field of operator spaces, in particular the definition of the Haagerup norm. The other was defined by Carlen and Lieb using results about convexity of certain functionals on matrix spaces. In addition to defining these two extensions we will present results showing that in some cases they produce inequivalent norms. If time permits we will present further extensions to multiple products of matrix algebras.