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Normal Compressions of Higher Rank Numerical Ranges

The classical numerical range has been studied extensively by mathematicians interested in the areas of functional analysis and matrix analysis since the 1930's. The higher rank numerical range generalizes the classical numerical range of an operator and is a much newer discovery which was first introduced by Choi, Kribs and Zyczkowski in 2006. Research into higher rank numerical ranges has originally been motivated by problems in quantum information theory, in particular the Knill-Laflamme representation of quantum data error correcting code. In this talk, we will discuss some of the basic structure and theory of higher rank numerical ranges and discuss their geometric representation in the complex plane \mathbb{C} . We will introduce a general program to describe normal compressions of normal (diagonal) operators and discuss an interesting pair matching problem that arises from 2×2 compressions. Finally we discuss continuity results attached to this pair matching problem.

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