

Function theory and geometry in a problem in linear algebra: circular numerical ranges

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In this series of lectures, we look at the numerical range of an $n \times n$ matrix through the lens of function theory and geometry. The motivation for this talk is a conjecture of Gau, Wang and Wu that was made in 2016. The first lecture provides the background necessary to understand the statement of the conjecture as well as prior work. The second lecture emphasizes visualization of the numerical range, a special class of matrices that represent compressions of the shift operator, and a class of functions associated with these operators. Using this background, a geometric proof of the conjecture in a special case will be presented.