



THE UNIVERSITY
of NORTH CAROLINA
at CHAPEL HILL

Undergraduate Research Seminar

February 20, 2024

3:30 - 4:30 p.m.

Zoom

Crouzeix's Conjecture, Blaschke Products, and Numerical Ranges

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Abstract. Crouzeix's Conjecture is an important open problem in operator theory that posits: for every square matrix A , the numerical range of A is a two spectral-set for A .

In this talk, we'll introduce Crouzeix's Conjecture and study it for a certain class of natural matrices defined via nice rational functions called finite Blaschke products. In this setting, Crouzeix's Conjecture suggests a related conjecture (the Level Set Crouzeix Conjecture) connecting numerical ranges of these matrices and level sets of finite Blaschke products. We will discuss progress made on the Level Set Crouzeix Conjecture in Summer 2022 and some remaining open problems. This work is joint with Pamela Gorkin, Changkun Guan, Martin Volymayr-Lee, and Annie Glenning.