

TEMPLE UNIVERSITY

Department of Mathematics

Analysis Seminar

Room 617 Wachman Hall

Monday, March 11 2019, 2:40 p.m.

*Analytic continuation in an annulus and in a
Bernstein ellipse*

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Abstract: Analytic continuation problems are notoriously ill-posed without additional regularizing constraints, even though every analytic function has a rigidity property of unique continuation from every curve inside the domain of analyticity. In fact, well known theorems, guarantee that every continuous function can be uniformly approximated by analytic functions (polynomials or rational functions, for example). We consider several analytic continuation problems with typical global boundedness constraints. All such problems exhibit a power law precision deterioration as one moves away from the source of data. In this talk we demonstrate the effectiveness of our general Hilbert space-based approach for determining these exponents. The method identifies the “worst case” function as a solution of a linear equation with a compact operator. In special geometries, such as the circular annulus this equation can be solved explicitly. The obtained solution is then used to determine the power law exponent for the analytic continuation from an interval between the foci of a Bernstein ellipse to the entire ellipse. In those cases where such exponents have been determined in prior work our results reproduce them faithfully.

This is joint work with Yury Grabovsky.