Mathematics Colloquium

Iteration of rational maps in two complex variables

Ryan Tully-Doyle
Department of Mathematics
Cal Poly, SLO

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Building 180 Room 112

Abstract

In functions of one complex variable, the Denjoy-Wolff theorem describes the possible behavior of iterates of an analytic function that maps the complex unit disk $\mathbb{D}$ into itself. Given an analytic function $f : \mathbb{D} \to \mathbb{D}$ that isn't an automorphism of $\mathbb{D}$, there exists a unique point z_0 in the closed disk $\overline{\mathbb{D}}$ so that the iterates of f converge uniformly to z_0. In two variables the situation is significantly more complicated. We'll look at an approach to visualizing the behavior of iterates of maps of the form $\Phi(z, w) = (\phi(z, w), w)$ where ϕ is a rational inner function. Even in this very special case, interesting phenomena can be described. We'll also look at a method for generating examples using matrices and graphs and some open questions.

This talk is appropriate for undergraduates and graduate students.

About the speaker: Ryan Tully-Doyle is an Assistant Professor in the Department of Mathematics at Cal Poly. He obtained his Ph.D. at UC San Diego. Prior to joining Cal Poly, he worked at Hampton University in Virginia and the University of New Haven in Connecticut. His research is largely in the area of operator theoretic functional analysis and several complex variables.