

BI-CO MATHEMATICS COLLOQUIUM

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"Building a Theorem: Start to Finish"

Monday, October 20, 2014

Talk at 4:15 – H109

Tea at 3:30 – KINSC Math Lounge, H208

Note: This talk will begin at 4:15pm.

Abstract:

What does a mathematics dissertation really look like? It depends on the discipline, but at its core it's a brand new theorem, or even several. The brand new answer to a new (or possibly old) question. This talk will focus on the process that led to the discovery and proof of one theorem.

In particular, we will consider a model of two species competing for a common resource in a habitat. One of these species will move selectively toward certain areas of the resource. How does this "intelligent" movement, or advection, affect the competition? The competition is modeled using reaction-diffusion-advection equations common to the study of chemical reactions or more simply, partial differential equations. Many properties of this system were already known, but we were able to make a significant contribution by asking the simple question: "What is large?" The question was investigated numerically using MATLAB, then proven using standard PDE techniques, such as linear stability.

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