

Michigan Math Club



Thursday at 4pm in EH1360
Pizza + pop outside afterwards!!



Exploring Patterns in Complex Dynamics – From Simple Doublings to Intricate Multibrots

Tia Scarsella

We begin this study of complex dynamics by examining the doubling map, detailing its function and the diverse patterns it generates. Then, we delve into the Mandelbrot set, focusing on the derivation of the equation for its main cardioid feature. The discussion extends to the broader realm of multibrot sets, where we investigate their formation and properties, generalizing our derived equation for the main shape in the Mandelbrot set to be applicable to all other integers not just 2. In order to do this we examine the system of equations for the envelope of lines that create the curves we are interested in studying.
Mentor: Katia Shchetka



Directed Reading Program Presentations

Stochastically Modeling Chemical Reactions

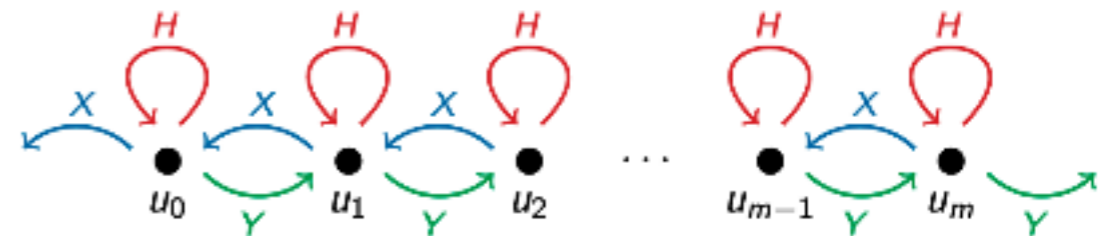
Mitchell Godek

When modeling reaction schemes, the importance of molecular fluctuations in shaping the qualitative behavior of the system cannot be overstated. In this presentation, I will briefly introduce the collision theory approach of modeling chemical reactions, discuss its limitations, and introduce Gillespie's exact stochastic simulation as an alternative approach. Additionally, I will further examine the qualitative differences between deterministically and stochastically modeled systems using the chemical Lorenz system and circadian oscillator in the *Drosophila*.

Mentor: Shivani Prabala



18 April 2024



Representations of $sl(2, C)$

Albon Wu

The Lie algebra of $SL(2; C)$, denoted $sl(2; C)$, has useful consequences in algebra and physics. In particular, the representations of $sl(2; C)$ explain angular momentum in particle physics and give insight into the representations of arbitrary semisimple Lie algebras. In this talk, we will introduce the representation theory of Lie algebras and characterize all irreducible complex representations of $sl(2; C)$.

Mentor: Sadie Lipman

