MSCS MESS

Department of Mathematics, Statistics, and Computer Science
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Next Monday's Colloquium

Title:	Zero forcing and power domination
Speaker:	Chassidy Bozeman
Time:	3:30 PM
Date:	September 24
Place:	RNS 310

About the talk: Zero forcing on a simple graph is an iterative coloring procedure that starts by initially coloring vertices white and blue, then repeatedly applies the following *color change rule*: if any vertex colored blue has exactly one white neighbor, then that neighbor is changed from white to blue. Any initial set of blue vertices that can color the entire graph blue is called a zero forcing set. The zero forcing number is the cardinality of a minimum zero forcing set. A well known result is that the zero forcing number of a simple graph is an upper bound for the maximum nullity of the graph (the largest possible nullity over all symmetric real matrices whose ijth entry (for i≠j) is nonzero whenever $\{i, j\}$ is an edge in G and is zero otherwise) A variant of zero forcing, known as power domination (motivated by the monitoring of an electric power grid system), uses the power color change rule that starts by initially coloring vertices white and blue and then applies the following rules: 1) In step 1, for any white vertex w that has a blue neighbor, change the color of w from white to blue. 2) For the remaining steps, apply the color change rule. Any initial set of blue vertices that can color the entire graph blue using the power color change rule is called a power dominating set. We present results on the power domination problem of a graph by considering the power dominating sets of minimum cardinality and the amount of steps necessary to color the entire graph blue.

About the Speaker: Chassidy Bozeman received her Ph.D. in mathematics from Iowa State University in April 2018. Her research interests include graph theory, linear algebra and combinatorial matrix theory. She enjoys road trips and traveling abroad, game nights, Thai and Indian food, reading, and DIY projects.

Next Friday's Research Seminar

Title:	Mathematical Tools for Understanding Plutonian Climate
Speaker:	Alice Nadeau
Time:	3:40 PM
Date:	September 28
Place:	RNS 204

About the Talk: Interest in modeling the climates of other planets has been stimulated by observations of the Pluto-Charon system and seven Earth-sized planets orbiting the nearby star TRAPPIST-1. Unfortunately, relatively little is known about our planetary neighbors compared to Earth, and even less is known about planets outside of our solar system. For this reason, scientists rely on conceptual climate models to understand the universe around us. Adapting well known conceptual models for Earth to extraterrestrial and extrasolar planets raises issues whose solutions draw from the fields of celestial mechanics, harmonic analysis, and nonsmooth systems. In this talk, Alice will give a brief introduction to the field of conceptual climate models, present a common model for Earth's climate, and discuss some of the challenges with adapting this model to other planets. She'll then share some recent results from adapting the model to Pluto to understand the stability of Pluto's nitrogen glaciers.

About the Speaker: Alice is in the last year of her PhD at the University of Minnesota. Her undergraduate institution was Grinnell College, where she majored in mathematics with an emphasis physics. It was there that she developed her interest in applications of math to the climate system of Earth and other planets. Over the course of her academic career she has held internships at the Cooperative Institute for Climate Science at Princeton University and John Deere (yes, the tractor company!), as well as fellowships with the Mathematics and Climate Research Network and the University of Minnesota's Institute on the Environment.

Math Club/PME Meeting!

Math Club and PME will be starting up again with its regular meetings on Thursday, September 27$^{\text{th}}$ at 11:10 AM in the sixth floor lounge of Regents Math. All are invited and welcome! Additionally, members of the class of 2022 are invited to apply to be a class representative. Interested persons should contact Laurie (balsta1@stolaf.edu) before the September 27$^{\text{th}}$ application deadline.

CIR Hours Correction

The permanent hours sign on the CIR door no longer bears correct office hour times. The new hours are available on the drop-in consulting page and below:
Sunday-Thursday 7:30-8:30pm
Monday/Tuesday/Thursday 1-2pm
Wednesday 4-5pm.

Tutoring Hours

Tutoring for math courses up to 252 and stats courses up to 316 is regularly available this semester. Statistics tutoring can be found in Buntrock 108 Monday through Friday and in BMC 012 on Sundays. Math tutoring is similarly scheduled. Excluding extenuating circumstances, students must attend at least one SI session per week (if available) to be eligible for tutoring. Appointment slots can be found and booked on the tutoring page of the CAAS website.

Weekly Theorem

Theorem: All positive integers can be defined in 13 words or less.
Proof: Suppose that not all positive integers can be defined in 13 words or less. Then, there must be a smallest positive integer n that is not defined in 13 words or less. Now, n is "the smallest positive integer that cannot be defined in thirteen words or less." Clearly, n is defined in 13 words, so the initial supposition is false. □

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