MSCS Mess

Department of Mathematics, Statistics and Computer Science
St. Olaf College
Northfield, MN 55057

November 8, 2004
Volume 33, No. 7

Mathematics Graduate School Night

Panelists: Katherine Crowley, Nicole Hoft, Paul Humke, Urmila Malvadkar
Date: Wednesday, November 10
Place: Trollhaugen Room in King's Room Complex, Buntrock Commons
Time: 6:00 dinner (bring your own caf meal!), 6:30 panel discussion
What: Learn all about life as a graduate student in mathematics--and why it might just be for you!

This Week's Colloquium

Title: Just What Does an Industrial Statistician Do, Anyway?
Speaker: Karen Jensen Hulting '83, Medtronic & Fred Hulting, General Mills
Time: Tuesday, November 9, 1:30 pm
(treats at 1:15)
Place: SC 182

In this talk we give an account of our experiences as Ph.D. statisticians working in the automotive, materials, chemicals, consumer products, and medical device industries. We will begin by painting a broad picture of the different types of consulting projects and research problems that we have encountered. Then we will focus on a few examples drawn from our recent experiences at General Mills and Medtronic.

23rd Annual Mellby Lecture

Title: A Voyager from the 4th Dimension
Speaker: Paul Humke
Time: Thursday, November 11, 7:00 pm
Place: Viking Theater

Problem of the Week

We talked about several problem solving techniques at the Colloquium on Tuesday. This problem uses one of the standards.

I have placed a dime in nine of the 36 squares of a 6 x 6 grid. You may choose three rows and three columns and take all the coins you find in them. Can you always get all nine coins?

*** Please submit all solutions by Wednesday at noon to Amelia Taylor by e-mail (ataylor@stolaf.edu) or by placing them in her box at OMH 201.

Last Week's Problem

The baseball playoff series between the Boston Red Sox and the New York Yankees lasted a full 7 games. How likely is it that a playoff series lasts 7 games, assuming the teams are evenly matched? Bonus: How likely is it that if two teams are evenly matched and the first team goes down 3 games to 0 (as they did), that the series will last a full 7 games?

As mentioned in the last Mess, there is a non-brute force solution to this question, which is the one I will give here. A seventh game is played if the series is tied after 6 games. The way to approach this is to assume the two teams play a full six games regardless of the order and number of wins. The teams don't actually do this, but it does not affect the probabilities. Think about this as a coin toss (the evenly matched part), then 7 games are played if and only if in 6 tosses of a coin there are exactly 3 heads. The probability of this is 6 choose 3 times (1/2)^6 = 5/16. For the Bonus, this simply refers to one of the 6 choose 3 scenarios that lead to seven games, so the probability is (1/2)^6 = 1/64. Note that the probability that the team wins the last 4 games of 7, as the Red Sox did this year, is 1/128.

Still Need an Interim Class?

Math 234: Investigative Mathematics

Mathematicians make discoveries only after computing many examples, noticing patterns, then inventing tools and language to describe what they see. With the aid of a computer, students conceptualize and prove theorems in a variety of mathematical areas. Closed to students who have taken courses beyond Mathematics 220. Professor: Jill Dietz.

Math 356: Geometry

Properties of axiomatic systems are illustrated with finite geometries and applied in a synthetic examination of Euclid's original postulates, well-known Euclidean theorems, and non-Euclidean geometries. Dynamic geometry software and hands-on labs are used to explore both the transformations and properties of these geometries. Prerequisite: Mathematics 220 and 244 or 252. Professor: Martha Wallace.

Another New CS Course

Computer Science 336: Logic Programming
This is a third level elective course in the curriculum that counts for the Computer Science major. Remember the three programming paradigms studied in CS 1: functional, imperative, and object-oriented programming. Each paradigm represents a different way of thinking about problem solving and constucting computer programs. There's one remaining major programming paradigm: logic programming in which a programmer creates a collection of logical rules that govern a computation to be performed by a reasoning machine known as an inference engine. This fascinating style of programming is valuable for artificial intelligence, for interdisciplinary applications that involve modeling human reason, and for declarative programming in general. Professor Allen.
Time: Tu 8:00-9:25, Th: 8:00-9:20.

Semester II Mathematics Course Offerings

A number of new and interesting courses are being offered next semester.
If you are interested, feel free to contact the appropriate instructor for additional information.

Math 236: Mathematical Biology
Math is useful for many things; for certain biological systems, it can provide significant insights. In this course we will formulate mathematical models from biological problems and interpret the results. We will use several different mathematical techniques, including matrix models, dynamical systems, and partial differential equations, applying these to systems such as interacting species, spatial movement, and structured populations. No biological background is required.
Time: MWF 12:55-1:50
Instructor: Urmila Malvadkar

Math 282b: Applied Math Seminar: Dynamical Systems
Even simple iterated functions can have complex and beautiful behavior. This course focuses on discrete mappings and covers stability, bifurcations, chaos, and an introduction to fractals. We will use both analytic and geometric tools to study these systems.
Time: Tu 8:00-9:25, Th: 8:00-9:20.
Instructor: Urmila Malvadkar

Math 352: Abstract Algebra II
This course offers a continuation of group theory and field theory, including group actions, Sylow theory, and Galois theory. Other topics may include representation theory, module theory, and more.
Prerequisite: Mathematics 252
Time: Tu 11:45-1:10, Th: 12:45-2:05; Instructor: Amelia Taylor

Math 370: Mathematical Logic
Mathematical logic examines fundamental concepts of mathematics, in particular, sets, proofs and deduction, and algorithms. The seminar will provide an introduction to three areas of logic: set theory, model theory, and recursion theory. In the process we will consider questions including: How do you define arithmetic for infinite sets? Are there true statements that cannot be proved? Are there mathematical questions that have yes/no answers for which no mechanical procedure can be devised to answer the question?
Prerequisite: Math 244 or Math 252.
Time: Tu 9:35-11:00, Th 9:30-10:50
Instructor: Kay Smith

Math 382: Seminar: Fourier Series and Differential Equations
Fourier analysis is an essential tool for mathematical applications, especially to physics, and a fascinating mathematical topic in its own right. The seminar will look at some of the following questions, among others: (1) Which functions can be represented by Fourier series? (2). How do we find such a representation, if it exists? (3). How can we use Fourier series to solve differential equations?
Prerequisites: Math 226 and Math 244, or permission of instructor.
Time: MWF 12:55-1:50
Instructor: Bruce Hanson

***If you would like to receive a copy of the Math Mess in your P.O. Box weekly, please e-mail Donna Brakke at brakke@stolaf.edu.

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