St. Olaf Mathematics Department

Math Mess

Department of Mathematics
St. Olaf College
Northfield, MN 55057

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This Week's Mathematics Colloquium

Title: A Simple ATM Backbone Network Reliability Model
Speaker: Veena Mendiratta
Time: Thursday, April18th, 2 pm
Place: SC 182

This Week's Colloquium

In this week's talk Dr. Mendiratta takes a look at measuring the reliability of an ATM network. One way to measure reliability is to look at the *connectivity* of the network. In other words, given two different nodes in the network, one asks how likely is it that they are connected to each other by some path? A second measure of reliability is the *performability* of the network: given that a connection between two nodes has been established, how likely is it that this connection is maintained, especially in the presence of other failures in the system? Dr. Mendiratta will look at both of these measures and analyze the connections between them.

Veena Mendiratta (PhD, Northwestern University, 1981) is a Consulting Member of Technical Staff at Lucent Technologies where she has worked in R&D since 1984 on a wide range of systems, and currently works in the Architecture area, focused on architecting and analyzing voice over packet networks. Professional activities include: MCM Advisory Board member and MCM judge since 1990; member of the SIAM Visiting Lecturer Program; member of the IEEE Distinguished Visitors Program; member of INFORMS and IEEE; and co-chairperson of the Chicago INFORMS Chapter.

(A complete version of this abstract is posted outside the Math Dept Office, OMH 200.)

Career Column

Career of the Week: Bioinformatician

Bioinformatics combines the tools of mathematics, computer science, and biology to uncover patterns and associations within and between sets of biological data. Computers are used to integrate, manage, analyze, and visualize genetic and biological information. This information is applied to study biological processes in organisms, determine how these processes go wrong in

diseases, and discover and develop drugs to treat, cure, and prevent diseases.
Learn more about this field by attending a seminar sponsored by the Molecular Biology Concentration on April 29 at 4:00 in SC 278. Dr. Kyle Furge will talk on "Unraveling the Human Genome: Implications for Career Diagnosis and Treatment."

For more about careers in biotechnology visit www.bhrc.ca/biotecareers and www.bioplanet.com. A few schools currently offer M.S. and Ph.D. programs in bioinformatics. Among these are Iowa State (www.bcb.iastate.edu) and Boston University (www.bu.edu/bioinformatics/).

N^{th} Annual Math Recital

This WEDNESDAY, Ytterboe Lounge, 7-9 pm, an event you won't want to miss. Remember, good food is provided by the faculty; good taste is provided by the students.

MAA T-shirts

This year's St. Olaf Mathematics t-shirts, "Who's Who in Ole Math," are now on sale! Look for the table in the hallway near SC 182. This year's t-shirts are $12 or, you can get a deal by buying **both** this year's and last year's shirts for a total of $15.

Games Tournament

The Games Tournament will end on Friday afternoon (whether it has started by then or not). If you're still interested, make plans to be in SC 184 between 3 and 6 Friday. The games are now Hex, Sprouts, Chomp, and Clobber; see www.stolaf.edu/people/molnar/games for details.

Last Week's Solution

Last week's problem: Let V_n be the collection of all functions that are equal to their own nth derivative. So, for example, V_1 is just all multiples of e^x; V_2 is linear combinations of e^x and e^{-x}, etc. (V_n is a vector space, but that isn't really the point here.) So, we have this infinite chain $V_1 \subseteq V_2 \subseteq V_4 \subseteq V_8$ ... . Does this chain eventually "stabilize", or is there always something in V_{2n} that is not in V_n?

Solution: There are always functions which are in V_{2n} but not V_n. **Adam McDougall** found some using Pascal's Triangle, which might make an interesting subject for a future POW. In the meantime, recall that the power series for e^x- $1+x+x^2/2!+x^3/3!+x^4/4!+$ ... - illustrates nicely why e^x is its own derivative: differentiate term-by-term. Summing only the terms with even powers in this series (resp., the odd ones) yields a function which is its own second derivative (cosh x; resp. sinh x) - but not its first. Similarly, taking every k^{th} term in the series will produce a function which is in V_k, but not in V_j for any $j < k$.

Problem of the Week

This week's problem comes to us from Jim Cederberg, who thought the kites and bricks puzzle was OK, but would have liked it even more if it was wood. He writes:

The standard dimensions in the US of a sheet of plywood are 48" by 96", or 4608 square inches area. A queen-sized bed is 60" by 80", or 4800 square inches. If we cheat a bit on the width, we should be able to get a 57.6" by 80" platform out of a single sheet. The problem is, how can you cut a single sheet of plywood into *two* pieces that can be repositioned to get a rectangle 57.6" by 80"? Or, alternatively, if you cheat the length instead of width, to get a rectangle 60" by 76.8"?

** Please submit all solutions to David Molnar (molnar@stolaf.edu) by noon on Sunday.

Editor-in-Chief: Bruce Hanson
Associate Editor: Beth Speich
MM Czar: Donna Brakke

Problem Guy: David Molnar
mathmess@stolaf.edu