Augarithms

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Colloquium Series Dates for Fall 2003

Colloquia are held on Wednesdays from 3:40 to 4:40 p.m. in Science 108. Except for the names of some of the speakers, here is the schedule of dates for the 2003-2004 academic year:

Oct.	8	Gerrard M. Carlson, Guidant Corporation
Oct.	22	Ioanna Mavrea, Augsburg College
Nov.	5	TBA
Nov.	19	TBA
Dec.	3	Glen Meeden, University of Minnesota

This week's talk...

Two-Dimensional Heart Rate Variability Footprint

Gerrard Carlson

The Two-Dimensional Heart Rate Variability (2-*D HRV*) Footprint is an image oriented rendering of instantaneous cardiac cycle length with instantaneous cycle length changes calculated over a period of 24 hours. The resulting 2-*D* density is approximated by binning normal cardiac cycle interval data over 24 hours. This reveals a joint structure of heart rate (*HR*) with *HRV*. Patients in heart failure often exhibit a constrained range of *HR* over 24 hours. Healthier patients show a wider swing in minimum to maximum 24 hour *HR* with increased variability overall. In the healthier patient more variability emerges particularly at lower *HR*. Less variability is observed at higher *HR*. The 2-*D HRV* Footprint presents a joint structural relationship between *HR* and *HRV* as an image.

About the speaker...

Dr. Gerrard Carlson has been with Guidant Corporation for 10 years. His primary interest is digital signal processing. Since coming to Guidant, he has been involved with heart sounds, heart rate variability, data compression and error correction.

St. Norbert College

DE PERE, WISCONSIN

Eighteenth Annual Pi Mu Epsilon Regional Undergraduate Math Conference

November 7—8, 2003

Featured Speaker: Richard Brualdi
University of Wisconsin—Madison

For further details, contact Ross Poss at St. Norbert, rick.poss@snc.edu

Puzzle & Problem

Last issue's problem about finding the cube root of 148,877 knowing only that it is a perfect cube was solved by **Kali Hargesheimer**, **Hung Nguyen**, and **Brent Lofgren** ('88). Here is this week's problem:

Three runners, *A*, *B*, and *C*, are in a foot race. *A* is twice as likely to win as *B*; *B* is twice as likely to win as *C*. Find the probability that *A* wins.

Last issue's puzzle (DOS + DOS + TRES = SIETE) was solved by Diane Glorvigen, Kali Hargesheimer, Andrew Held, Hung Nguyen, and **Brent Lofgren** ('88), who also found solutions for bases 2, 8, and 16. Here is this week's puzzle:

Which day of the week has an anagram (no slang allowed)?

Send your solutions to the editor at kaminsky@augsburg.edu, or drop them in the *Puzzles & Problems* box just inside the math suite, Science Hall 137.

Augarithms is available on-line at augsburg.edu/math/augarithms/. Click on the date you want to see.

Mathcartoons.com is a website of old and new math and other cartoons by your editor. Visit at mathcartoons. com, and let us know what you think.

Do you get the idea that people think you talk too much. If you think they might be right, then join

On-and-on Anon...

...the 12-step program with you and your problem in mind. Groups are now forming. First meeting is November 31 on the quad.

The Bi-weekly Newsle
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Newton's method†

Named after British physicist, astronomer and mathematician Sir Isaac Newton (1642-1727), this is an iterative method for approximating solutions to a non-linear equation $f(x) = 0$ by repeatedly computing

$$x_{NEW} = x_{OLD} - f(x_{OLD})/f'(x_{OLD}).$$

This is equivalent to approximating a function by its tangent and converges quadratically if the initial estimate is sufficiently close to the root. In more than one dimension Newton's method is

$$x_{NEW} = x_{OLD} - G^{-1}[f(x_{OLD})]$$

where G is the matrix of partial derivatives of f evaluated at x_{OLD}.

J Stoer and R Bulirsh, *Introduction to Numerical Analysis* (New York, 1980)

†Reprinted with permission from *Dictionary of Theories*, by Jennifer Bothamley, Visible Ink, Detroit.

Join Augsburg's Math Club, Unbounded, in wishing herzliche Glückwünsche zum Geburtstag (happy birthday to) Hans Arnold Heilbronn

Hans Heilbronn

Come join **Unbounded**, Augsburg's Math club after this week's colloquium (that's about 5 p.m. in Science 108). This week they are celebrating the birthday of Hans Heilbronn. Now you can read his biography.

Hans Heilbronn was born on October 8, 1908 in Berlin, Germany. He entered the University of Berlin taking courses in physics, chemistry and mathematics. Heilbronn moved to Göttingen and began to undertake research in the number theory. Due to Hitler coming to power, Heilbronn was dismissed from his position as an Assistant at Göttingen and later accepted an offer from the University of Bristol. While at Bristol, Heilbronn proved a conjecture of Gauss on imaginary quadratic number fields, and with Linfoot and Heilbronn, proved that there are at most ten quadratic number fields of class number one. He then accepted the Bevan Fellowship at Trinity College, Cambridge in May 1935 and published papers with on Waring's problem, which deals with writing integers as sums of fourth powers, on sums of two cubes and a square, and on the sum of a prime and a k-th power. Heilbronn returned to Bristol in 1946 and later became Head of the Department of Mathematics. At Bristol, Heilbronn worked on the Euclidean algorithm. For his outstanding contribution to mathematics, he was elected a Fellow of the Royal Society in 1951. Heilbronn resigned from Bristol in 1964 and moved to North America. After a short stay at the California Institute of Technology, Heilbronn and his wife moved to Toronto where he was appointed to the Chair of Mathematics at Toronto University. Heilbronn died on April 28, 1975 in Toronto, Canada.

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