

Department of Mathematics and Computer Science Newsletter



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Editor: Mary Margaret Hoy

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Professional Activities

Sharon Barrs, Debbie Evans, Cynthia Sikes and Debbye Stapleton presented "Wetland Wonders Project" at the Georgia Mathematics Conference held at Rock Eagle Center during October 16-18, 1997.

Sharon Barrs and Mary Margaret Hoy presented a workshop "Using the TI-83 and CBL for Experiments" at the Georgia Mathematics Conference held at Rock Eagle Center during October 16-18, 1997.

Rose Mae Bogan attended the State Council Meeting for the Georgia Academy of Science as the representative for the Science Education Division on October 4, 1997, in Macon, GA.

Lydia Bragg attended the Georgia

Mathematics Conference held at Rock Eagle Center on October 17, 1997. She presided at the presentation "Gender and Mathematics."

Wendy Habegger and Mary Margaret Hoy presented "Gender and Mathematics" at the Georgia Mathematics Conference held at Rock Eagle Center on October 16-18, 1997. The presentation reported on their individual InGEAR projects as well as research conducted by **Ellen Fischer** and **Cindy Gonzalez**.

Bill Meisel, with the aid of **Wendy Habegger**, presented "Everything You Ever Wanted to Know About Teaching Statistics with a TI-83 But Were Afraid to Ask" on October 17, 1997, at Rock Eagle Center. **Ellen Fischer** was recovering from illness and unable to attend, but should get

credit for being there since Bill said a lot of what she would have said had she been there. A special thank you to **Wendy Habegger** for helping out.

Lisa Norton and Donna Saye presented "What Effect Does Using Graphing Calculators Have on Algebra Students?" at the Georgia Mathematics Conference held at Rock Eagle Center during October 16-18, 1997.

Anne Pierce served as a member of a CS Accreditation Commission (CSAC) visiting team during October. She came back from the visit with some ideas which we might use in the CS area and is glad to be back in the sunny (?) south.

Lila Roberts will attend the SIAM (Society for Industrial and Applied

Mathematics) Conference on Applied Linear Algebra at Snowbird Ski Resort, Utah, from October 28-November 1. She will present "Promoting Understanding in Undergraduate Linear Algebra" on November 1.

Lila Roberts has been invited to present a lecture at the 9th Annual International Colloquium on Differential Equations in Plovdiv, Bulgaria, to be held August 18-23, 1998.

Arthur Sparks is serving as Chair of the Phi Kappa Phi Honors Committee and is also a member of the Phi Kappa Phi Executive Committee.

Arthur Sparks represented the Math/CSC Department at a special University Reception for high ability students held in Atlanta on October 16, 1997, at the Marriot at Perimeter Center. Prospective students and their families met with various representatives and asked questions in their area(s) of interest. There was an excellent turnout for this event. While in Atlanta, Arthur met with a representative of Emtec, Inc. about an equipment grant involving Sun workstations. Upon leaving Atlanta, Arthur attended the Georgia Math Conference held at Rock Eagle.

David Stone attended the MAA Summer MathFest in Atlanta in August. While there he participated in the meeting of the MAA Board of Governors, chaired the meeting of the MAA Committee on Sections and conducted the Section Officers Meeting. David also participated in an orientation session for new Governors. He was on the Program Committee for this meeting.

David Stone is again assisting with the Statesboro High School Math Team (Harry Hu is on this team).

Pam Watkins presented "A Close-up Look at Cans," a one-hour workshop at the GCTM meeting in Rock Eagle on October 17, 1997.

Pam Watkins attended the Coastal Georgia Writing Project Conference at the Coastal Georgia Center in Savannah, GA, on October 24, 1997.

Lisa Yocco presented "Applications of Matrices Using the TI-83" at the GCTM State Conference on October 17, 1997.

Lisa Yocco presented "The Use of a Graphing Calculator to Enhance Algebra" at the South Carolina Lowcountry Mathematics and Science HUB Day sponsored by The Technical College of the Lowcountry, Beaufort, SC, October 24, 1997.

Lisa Yocco was nominated to serve as a "Faculty Friend," a program sponsored by the Residence Life Office. Nominations were solicited by students who were asked to submit the name of a faculty member that built positive relationships with students. Participating in the Faculty Friends Program involves spending a few hours each month with the residence students at a particular residence hall.

Faculty Senate Report

Submitted by **Pam Watkins**

The senate voted to have a two-day break in October and a three-day break at Thanksgiving rather than the

proposed nine-day break (five-days and two weekends) at Thanksgiving during Fall Semester 1998. Additional input and opinions are being sought in regard to the "Intellectual Property" statement that we all had to sign as a condition of employment this year. Comments should be sent to Dr. Lane Van Tassell at P.O. Box 8008 by November 21, 1997.

Center for Teaching Excellence

Submitted by **Pam Watkins**

Pam Watkins wants to thank all those who helped make the Center for Excellence in Teaching's Open House on October 21, 1997, a big success. Remember, there are great opportunities for faculty development in teaching being offered at least twice a week through the CET. Check out the CET web site at www2.gasou.edu/cet to register on-line.

Personal News

Rose Mae Bogan's son, Lamont Berger, received a plaque from NASA for outstanding service for the production of a video used to promote the educational division of NASA. In addition, he received Al Gore's "Golden Hammer Award" for outstanding contribution to the government.

David Stone participated in the "Enochs 30-30" celebration at the University of Kentucky in June. David's dissertation adviser, Ed

Enochs, has now been at UK for 30 years and has produced more than 30 doctoral students. Many of them traveled from far and near to honor him — there were social events and mathematical talks and tale-telling. David emceed at the Friday night banquet, after which David and Ann drove all night to Atlanta for another auspicious occasion: youngest daughter Sarah's graduation from Georgia Tech on Saturday morning.

November Problem of the Month

Submitted by **Bill Meisel**

This month I have a simple little equation for you to solve:

$$\frac{3x^4+x^2-2x-3}{3x^4-x^2+2x+3} = \frac{5x^4+2x^2-7x+3}{5x^4-2x^2+7x-3}$$

Need I mention that using your graphing calculator or *Mathematica* is cheating? I have a particular solution in mind, but if your solution is slicker, it will be printed.



Happy Birthday!



November Birthdays

John Davenport	01
Joyce Strozso	03
Earl Lavender	09
Vrej Zarikian	25
Debye Stapleton	27

Happy Late Birthday

Patricia Humphrey, October 28



Happy Birthday!



October Problem of the Month

Submitted by **Bill Meisel**

Find the sums of the following infinite series:

$$(1) \quad \frac{1}{3!} + \frac{2}{5!} + \frac{3}{7!} + \frac{4}{9!} + \dots$$

$$(2) \quad \frac{1^2}{3!} + \frac{2^2}{4!} + \frac{3^2}{5!} + \frac{4^2}{6!} + \dots$$

Solutions

Submitted by **Yingkang Hu**

Problem 1

From $\sinh x = x + \frac{x^3}{3!} + \frac{x^5}{5!} + \dots = \sum_{n=0}^{\infty} \frac{x^{2n+1}}{(2n+1)!}$, we have

$$\frac{\sinh x - x}{x} = \sum_{n=1}^{\infty} \frac{x^{2n}}{(2n+1)!}$$

$$\begin{aligned} \text{Define } f(x) &= \frac{\sinh \sqrt{x} - \sqrt{x}}{\sqrt{x}} \\ &= \sum_{n=1}^{\infty} \frac{x^n}{(2n+1)!} \end{aligned}$$

Then $f'(x) = \sum_{n=1}^{\infty} \frac{nx^{n-1}}{(2n+1)!}$ and the given series is simply $f'(1)$.

It can be verified that

$$f'(x) = \frac{(\cosh \sqrt{x} - 1) - (\sinh \sqrt{x} - \sqrt{x})/\sqrt{x}}{2x}$$

$$\therefore f'(1) = \frac{(\cosh 1 - 1) - (\sinh 1 - 1)}{2} = \frac{\cosh 1 - \sinh 1}{2} = \frac{1}{2e}$$

$$\boxed{\frac{1}{3!} + \frac{2}{5!} + \frac{3}{7!} + \frac{4}{9!} + \dots = \frac{1}{2e}}$$

Problem 2

Define $f(x) = \frac{(e^x - 1 - x - \frac{1}{2}x^2)}{x} = \sum_{n=3}^{\infty} \frac{x^{n-1}}{n!}$ and $g(x) = \frac{(e^x - 1 - x - \frac{1}{2}x^2)}{x^2} = \sum_{n=3}^{\infty} \frac{x^{n-2}}{n!}$.

We have $f''(x) = \sum_{n=3}^{\infty} \frac{(n-1)(n-2)x^{n-3}}{n!} = \sum_{n=3}^{\infty} \frac{(n-2)^2 x^{n-3}}{n!} + \sum_{n=3}^{\infty} \frac{(n-2)x^{n-3}}{n!}$.

$$\therefore f''(1) = \sum_{n=3}^{\infty} \frac{(n-2)^2}{n!} + \sum_{n=3}^{\infty} \frac{n-2}{n!} \quad (1)$$

Also, $g'(x) = \sum_{n=3}^{\infty} \frac{(n-2)x^{n-3}}{n!}$.

$$\therefore g'(1) = \sum_{n=3}^{\infty} \frac{n-2}{n!} \quad (2)$$

From (1) and (2), the given series $\sum_{n=3}^{\infty} \frac{(n-2)^2}{n!} = f''(1) - g'(1)$. (3)

From the definitions of f and g , we have $f'(x) = \frac{e^x}{x} - \frac{e^x}{x^2} + \frac{1}{x^2} - \frac{1}{2}$

and $f''(x) = e^x \left(\frac{1}{x} - \frac{2}{x^2} + \frac{2}{x^3} \right) - \frac{2}{x^3}$.

$$\therefore f''(1) = e - 2 \quad (4)$$

And $g'(x) = \frac{xe^x - 2e^x + 2 + x}{x^3}$.

$$\therefore g'(1) = 3 - e \quad (5)$$

From (3), (4) and (5), $\sum_{n=3}^{\infty} \frac{(n-2)^2}{n!} = f''(1) - g'(1) = (e - 2) - (3 - e) = 2e - 5$.

$$\frac{1^2}{3!} + \frac{2^2}{4!} + \frac{3^2}{5!} + \frac{4^2}{6!} + \dots = 2e - 5$$