

UNDERGRADUATE MATHEMATICS SEMINAR

The next seminar of the winter term will be:

DATE: TUESDAY, March 3rd

Time & 3:45pm – Refreshments in the Math Common Room, **Bailey 204**

Location: 4:00pm – Seminar in **Bailey 207**

In this seminar, the math department's own **Professor Kim Plofker** will deliver the following seminar talk.

TITLE: Is Algebra Bad (for Mathematics)?

ABSTRACT: Nowadays we rely on basic algebraic notation and methods in almost every mathematical subject. It may be hard to imagine that there was ever a time when mathematicians vehemently disagreed, like modern physicists fighting over string theory, on whether algebra was truly useful or just a pointless exercise in abstraction. This talk will survey some of the history of the development of algebra, the controversy over its use in Renaissance Europe, and its gradual conquest of mathematical practice.

Mathematical Contest in Modeling 2009, by Peter Bonventre '11 and Steven Neier '11

[Editorial Introduction: Every winter, undergraduate teams from colleges and universities around the world that are competing in the Mathematics Contest in Modeling (MCM) are given two "real world" problems, select one, and then **spend an extended weekend** developing a solution and writing a paper justifying their solution. After submitting their paper, a panel of math professors (including our very own Professor Black) judges and rates the solutions. To see this year's problems, go to <http://www.comap.com/undergraduate/contests/mcm/contests/2009/problems/>. To learn how Union's team's experience, read on!]

From Thursday, February 5th at 8 pm to Monday, February 9th at 7:59 pm, while every one else was huddled in their dorms like normal persons, **Peter Bonventre**, **Steven Neier**, and **John Robens** locked themselves away in the physics study lounge to participate in an math contest in modeling – in fact, The Mathematical Contest in Modeling, sponsored by COMAP (Consortium for Mathematics and Its Applications). In this contest, COMAP provided two open-ended modeling problems for those interested in submitting a solution. This year's questions included modeling the most effective

traffic circle or various aspects of cell phone energy consumption.

When first approached with these problems, we researched the different topics involving each of these problems, with a hope to shine some light on the various principles and problems to form a good model. After brief self-reflection, we came to understand that our expertise's were limited to outside what was required to accurately program and model traffic flow through a roundabout, and we therefore decided that modeling cell phone usages was an interesting problem we wanted to tackle, aka became our only real option.

Our next step was to continue our research, but focus more on searching for information that we could incorporate into a model. After many hours of reading computer screens and a singular book, we called it a night and decided to meet way too early in the morning.

When we reconvened, we started to come up with the basic ideas and structure for our model. This model for cell phone energy consumption grew as we added terms for charging, standby usage, and manufacturing; we also modeled

current landline power consumption, which involved not only charging of cordless phones, standby usage, and manufacturing, but also various intermediate power consumption steps. In addition, we modeled how the energy consumption of US would change if we transition from its current telecommunications infrastructure to one of exclusive cell phone use.

We concluded, using a plethora of census, electronic, and manufacturing data, as well as couple of assumptions [note: "a couple" may refer to a large number, but one that does not necessarily skew our data entirely, but also one that were necessary and were usually supported by various sources], that strict cell phone usage was more energy efficient than any combination of cell phones with cordless landlines. From these calculations, we also modeled, using projection population and economic growth, the cell phone usage and energy consumption of an exclusively-cell phone using US for the next 50 years.

Additionally, we calculated that obscene amount of electricity wasted from ignorance in removing and unplugging common electronics and appliances; we found the waste from a selection of popular items was an order of magnitude higher (10^{11} Wh, or in more direct terms, almost 70,000 barrels of oil per day) than all telecommunication energy usage per day. In even more direct terms, we waste way too much energy.

Overall, this was an enlightening experience, with a 32-page research paper to show for it, and we hope that people can come to our talk at the Hudson River Undergraduate Math Contest and Steinmetz to learn more exciting details about how exactly those assumptions and our model fit so well together. And maybe some poor saps like us reading this will be inspired to come join in the fun and participate next year.

HRUMC: Deadline Approaching!

HRUMC XVI: April 18th The 16th annual Hudson River Undergraduate Mathematics Conference will be hosted **at Union College (!)** on Saturday, April 19th. If you wrote or are writing your thesis this year, the HRUMC is a wonderful place to share your results with math majors from scores of other colleges. You should strongly consider presenting a 15-minute talk. HURRY! The **deadline** for submitting an abstract is **Monday, March 2nd**. To submit, either follow the HRUMC link from the Math Department homepage www.math.union.edu or go to the HRUMC website at www.skidmore.edu/hrumc.

Post-Putnam Problem Solving Contest!

Following up the fall term fun of the Putnam Exam, on **Saturday, March 28th**, (on the weekend before spring term begins, the University of Rochester will be offering a **Math Olympiad for Undergraduates**. Last year, a total of 48 students from 7 colleges (Cornell, RIT, Nazareth, Saint John Fisher, Saint Bonaventure, SUNY Brockport, SUNY Geneseo and Rochester) participated in the contest. This contest consists of four proof-based problems to be solved in a span of three hours. And **CASH** prizes are awarded: \$250 for first place, \$200 for second place, and \$150 for third place.

If there is enough interest at Union, we will administer this contest on campus. If you would like to participate, please contact **Professor Friedman** in Bailey 107D, or via email: friedmap@union.edu)

Problem of the Newsletter: February 27th, 2009

A solution to last week's Problem of the Newsletter has been posted on the bulletin boards in Bailey Hall.

Here is this week's problem: An $n \times n$ matrix is called a *Latin square* if each of the integers $1, 2, \dots, n$ occurs exactly once in each row and column. Find the number of distinct 4×4 Latin squares. Try to generalize and find the number of $n \times n$ Latin squares.

Professor Friedman will accept solutions to this problem until 12:00 noon Thursday, March 5th. Email your solution to him (friedmap@union.edu) or put it in his mailbox in the Math Department's office on the second floor of Bailey Hall.