

Augarithms



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April 2, 2008

Mathematics Colloquium SPRING Lineup

Colloquia are now typically held Wednesdays 3:40—4:40 in Oren 111. Refreshments are always provided.

Feb. 27	Matt Haines, Augsburg College
Mar. 12	Michael Weimerskirsh, St. Olaf College
Apr. → 2	Augsburg Students—Trevor Floren & Billy Helm ¹
Apr. 16	Michael Conklin, Advanced Analytics

¹This weeks colloquium...

Student Projects—Trevor Floren & Billy Helm

Gender and Money in Tennis—Trevor Floren



Using Rosen's (1986) elimination style tournament model, I will test for the possibility that male and female tennis players respond differently to increases in prize money spreads associated with tournaments in their respective professional tennis tours. Although empirical work on tournament theory has grown, few have focused on match-play elimination style tournaments or the possibility of gender differences within tournament settings. Gilsdorf and Sukhatme (2007a and 2007b) find that larger prize spreads increase the

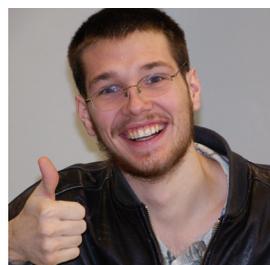
probability that the favored player wins a match in both the men's and women's professional tennis circuits, supporting predictions by Rosen's tournament model. However, they do not test for gender differences in responsiveness to incentives.

Several studies have investigated the potential for gender differences within a tournament setting using data from foot-racing tournaments (Maloney and McCormick (2000)), (Frick and Prinz (2003)). Maloney and McCormick find women more responsive to prize money at the time of entry but less responsive than men during the race. Frick and Prinz also suggest greater female responsiveness in the entry decision, but find conflicting prize money effects during

the competition. Their empirical approach is limited, however, because the prize money levels and spreads in foot-racing tournaments are often very small. My paper contributes to the literature because it combines elimination style tournaments from professional tennis with a focus on gender differences using a rich data set that allows me to control for important factors that may affect player performance.

I intend to estimate my model using Ordinary Least Squares and obtain data from the 2007 Association of Tennis Professionals (ATP) and the Women's Tennis Association (WTA) tennis circuit. The model will attempt to estimate the most important determinants that affect the number of unforced errors a player commits in a match, such as prize money differentials.

Art by Numbers—Billy Helm



What makes an exceptional composition in artwork? To answer this question one must understand the following criteria: color contrasts, division of space, focal points, the visual path, and the visual tension within the artwork.

These criteria can be understood with mathematics, deepening our intuition of what is a visually appealing painting. The purpose of this study is to quantify how the previous factors construct an exceptional composition. In this talk we apply this analysis to works by the Baroque painter Michaelangelo Merisi

Penniless migrant becomes a maths superstar²

By Donald Macintyre in Jerusalem, Friday, 21 March 2008

A 63-year-old mathematician who worked as a labourer and night-watchman when he first migrated to Israel from Russia has solved a problem which has taxed the world's leading experts in his field for more than a generation.

Avraham Trakhtman (see photo) has ended the mystery of the Road Colouring Problem by proving the theory of a "universal map" which allows a journey to end at a certain destination whatever the starting point by following the same instructions.

Professor Trakhtman of Bar-Ilan University managed to jot down the proof in pencil (contued on side two)

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(continued from side one)



on eight pages of paper. In layman's terms, the problem – in the field of symbolic dynamics – can be expressed as whether a man who arrives in a city without street names to visit a friend and telephones for help, could be given directions which would work wherever he was at the time. The solution – which appears to defy logic but which mathematicians believe could have

real-life applications in mapping and computer sciences – has excited widespread interest and admiration among Professor Trakhtman's international peer group.

It is all the more remarkable since Professor Trakhtman, who came from Sverdlosk (now Yekaterinburg) in the Urals as a Jewish immigrant to Israel, has achieved the triumph of his career at an age well beyond that at which mathematicians are normally expected to reach their peak.

The Road Colouring Problem was originally posed in 1970 by Benjamin Weiss, an Israeli-American mathematician, and Roy Adler, who both worked at the computer giant IBM. They posited that, given a finite number of roads, they could be depicted in a colour-coded map that would lead to the same destination regardless of the point of origin. Around 100 experts, including the authors of the proposition, have attempted to produce a proof but all failed.

In a diagrammatic version of the conjecture – now a theorem thanks to Professor Trakhtman – a 16-line graph forming one square and eight triangles, with the lines coloured red or green, includes two vertices, each representing different destinations. Following the route “blue red red” repeated three times always leads to one, and following “blue, blue red” always leads to the other, whatever the starting point.

Stuart Margolis, who recruited Professor Trakhtman to Bar Ilan, near Tel Aviv, told Associated Press: “In math circles, we talk about beautiful results – this is beautiful and it is unexpected. Even in layman's terms it is completely counterintuitive, but somehow it works.”

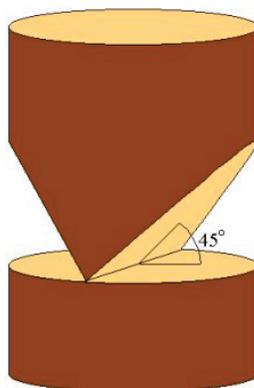
Professor Margolis said that the discovery was all the more remarkable given Professor Trakhtman's age and background. “The first time I met him he was wearing a night watchman's uniform,” he said.

Professor Trakhtman said that it took him a year to solve the problem. But he insisted to AP: “The solution is not that complicated. It's hard, but it is not that complicated. Some people think they need to be complicated. I think they need to be nice and simple.”

Benjamin Weiss said that it gave him great joy to see someone solve his problem, adding that Professor Trakhtman's solution “is something that is understandable.”

²Reprinted with permission from *The Independent*.

Problem of the week...³



We received a partial solution to the POTW of the last issue from **Michael Janas**. And now, for the new problem:

A lumberjack fells a tree 2 feet in diameter by cutting halfway through on both sides. The lower edge of each cut is horizontal while the upper edge makes an angle of 45 degrees to the horizontal. See the figure on the left. How much wood is cut out?

Submit solutions to:

kaminsky@augsborg.edu., or under Ken Kaminsky's door at SCI 137E, or in the puzzles and problems box just outside of Su's office.

³Reprinted with permission from Bradley U's 'potw' page <bradley.bradley.edu/~delgado/>

Puzzle of the week...

Brietta Schluender and **Rami Saikali** solved the *Egyptian Fraction* PuOTW from the last issue. They found that $19/94 = 1/5 + 1/470$. Here's a new puzzle:

In a school there are 158 students. Although there are more girls than boys, only 1/11 of the girls wear glasses, while 1/7 of the boys wear them.

How many boys and how many girls are there in the school?

Submit solutions to kaminsky@augsborg.edu., or under Ken Kaminsky's door at SCI 137E, or in the puzzles and problems box just outside of Su's office.

30th Annual Pi Mu Epsilon Conference

The Thirtieth Annual Pi Mu Epsilon undergraduate mathematics research conference will be held on Friday, April 11 and Saturday, April 12. The invited speaker is **Joe Gallian**.

All interested faculty and students in the upper Midwest are invited to attend this conference, held in P. Engel Hall on the campus of St. John's University. The conference will feature papers presented by undergraduate mathematics students.

For further information, contact Su Dorée or John Zobitz.

Don't forget kids...

Friday is **Pocket-Protector Day** at the dome. But hurry. Offer good only while they last. Void where prohibited. Limit—one per family.