MSCS Mess

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This Week's (Tailgate Party) Colloquium

Title: Great Expectations; or What to expect when you are watching a baseball game
Speakers: Bruce Hanson and Matt Richey
Time: Wednesday, September 29, 7:00 pm
Place: SC 282

The Tailgate Party begins at 6:00 in the Science Center Lobby with a plethora of great food (brats, beans, chips, the works).
Sundaes will be served after the talk at 8:00. Don't forget to email Donna Brakke (brakke@stolaf.edu) with your caf number.

It is often said that baseball is a game of situations--one on, no one out; base loaded, two outs. In each situation, there is an expected (average) number of runs scored. This information informs not only strategy ("To bunt or not to bunt") but influences overall fan happiness (should you be happy holding the other team to one run with the bases loaded, two outs?). As well, by making an analogy to par in golf, we can use the expected runs scored to help assess batting proficiency. All this and more will be explained by Matt Richey and Bruce Hanson. Actual ballpark memorabilia will used during the talk.

This talk is accessable to all audiences. Some knowledge of baseball is helpful, but not required.

Problem of the Week

In an attempt to bring out a few more solvers and to warm up for and celebrate the Tailgate party, here is a baseball question.

After a baseball player gets a hit, his batting average rises by exactly 0.010. Assuming the batter has at least one hit, what is the number of hits the player has made during the season? (The batting average of the player is the number of hits divided by the number of "at bats"). Can you determine the number of at bats?

If you want to get the Mess problems of the week ahead of time, they will be sent out on Thursdays on the math-probsolv email alias. Let Amelia Taylor (ataylor@stolaf.edu) know if you would like to be added to the alias.

*** Please submit all solutions by Wednesday at noon to Amelia Taylor by e-mail (ataylor@stolaf.edu) or by placing them in her box at OMH 201.

*** This year, many crazy things (like putting the problem of the week on the front page, book reviews, new fonts) might occur in our effort to better serve our readers. If you have any ideas for

the mess or comments about what we are doing, please contact either editor.

New Faculty Spotlight: Olaf Hall-Holt

Olaf grew up in West Africa, studied mathematics in Budapest, and has worked in CS from coast to coast. He co-founded the Twin Cities Free-Net, and enjoys playing soccer and ultimate frisbee, learning about first century history, and winter camping.

Olaf earned his Ph. D. in CS at Stanford University in 2002, and has been a Postdoctoral Research Associate at SUNY Stony Brook since then. His research interests include computational geometry, graphics, computer vision, and elements of human cognition. His thesis, Kinetic Visibility, concerns independently moving objects in two dimensional space: he developed and implemented a provably efficient algorithm for determining which of those objects a (moving) observer could see. More recently he has been scanning complex physical objects with cameras in real-time and efficiently producing computer models of the three-dimensional objects being scanned, using low-cost hardware.

Olaf served as both a teaching assistant and an instructor at Stanford, and taught a special Calculus course at Stony Brook that focuses on pedagogical experimentation and active learning. He has worked with students on research projects since his days as a staff researcher at the Geometry Center in Minnesota, between college (at Swarthmore) and graduate school. A thoughtful teacher who cares for his students, Olaf has many ideas for combining technology and pedagogy, including applications of his research, and looks forward to teaching beginners and undergraduate research students alike.

Last Week's Problem

A car rode over an ant on the pavement. The ant stuck to the tire for one revolution and then was deposited back onto the pavement. Assuming that the radius of the tire is one foot, find the length of the curve traveled by the ant between its death and its final resting place.

Bummer, no solutions were sent this week. The ant can be considered to be a point on the rim of a turning wheel that is moving in a straight line. On page 845 in Ostebee and Zorn's Calculus book, Volume 3, they give the equations for parametrizing a cycloid, which is the type of curve that the ant follows, and we need to fit the parametrization to our situation. The motion described in the problem can be modeled as the vector sum of a uniform linear motion and a uniform circular motion. Specifically, for this problem, the fact that the ant starts on the bottom of the wheel and will move in a clockwise direction around the wheel, leads to the parametrization $(? \sin t, ? \cos t)$ for $0 ? t ? 2?$ for the circle. The linear motion can be modeled by the parametrization $(t,1)$, also for $0 ? t ? 2?$. Thus, the cycloid that describes the curve the ant followed is parametrized by $(t ? \sin t, 1 ? \cos t)$ for $0 ? t ? 2?$. The arclength of this curve is $\int_0^{2?} \sqrt{(1 ? \cos t)^2 ? (\sin t)^2}\, dt = \int_0^{2?} \sqrt{2(1 ? \cos t)}\, dt =$ $\int_0^{2?} \sqrt{4 \sin^2 (t/2)}\, dt = \int_0^{2?} 2 \sin(t/2)\, dt = 8.$ (see page 658 in OZ Volume 3). The model here assumed that the wheel was moving in a straight line and the one person who did attempt the problem, asked the interesting question, what would happen if the car was turning a corner?

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