MAA

The Mathematical Association of America

The Math Club/MAA Student Chapter presents

From Rainbow to the Lonely Runner

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Wednesday, January 24, 2007
3 – 4 pm, Simpson Tower 213
(Refreshments 2:30 - 3)

Abstract: Graph theory possesses many intriguing close connections to other fields in mathematics such as number theory, topology, geometry and others. This talk introduces recent discoveries on using coloring parameters in graph theory to establish relations between two well-known open problems: The "plane coloring problem" and the so called "lonely runner conjecture" (in number theory and geometry).

> **Plane coloring problem:** What is the smallest number of colors needed to color all the points on the two-dimensional Euclidean plane (or simply the xy-plane) such that any two points of distance one apart get different colors? Although it is known that four colors are needed and seven colors (rainbow coloring!) are enough (Moser and Moser [1961] and Hadweiger [1964]), the exact minimum number remains open.
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> **Lonely runner conjecture** (Wills [1967] and Biennia et al. [1998]): Suppose k runners are running laps with different speeds (a constant speed for each runner though) on a circular track of circumference r (say, r = 400 meters). A runner is called "lonely" if he or she has distance at least r/k apart from all other runners. The "lonely runner conjecture" asserts that for each runner there exists some moment that he or she is lonely. Although it has attracted extensive attention in the past 40 years and the cases for k = 2, 3, 4, 5 have been confirmed, the conjecture remains widely open for k > 5.

Background in graph theory is NOT required for this talk.

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Math Club website: http://www.calstatela.edu/academic/math/Math_Club/mathClub.htm