BI-CO MATHEMATICS COLLOQUIUM

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"Decision Trees and Fundamental Complexity, or Topology: It's Not Just for Topologists"

Monday, March 5, 2007

Talk at 4:15 p.m. – KINSC H109
Tea at 4:00 p.m. – KINSC H109

Abstract: When we program a computer to solve a problem for us (such as taking the determinant of a matrix), we create a series of instructions, an algorithm, for the computer to follow in order to generate an answer. However, two different algorithms which solve the same problem can take dramatically different times to finish.

This begs the question: for any given problem, what is the best algorithm for solving it? This is in general very difficult to answer. I will consider the following problem (the "k-equal problem"): given a list of numbers, determine if any k of them are equal. I will exhibit an algorithm which solves this problem and I will show how we can use geometric intuition and powerful tools from topology and combinatorics to prove that this algorithm is the best possible.

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