abstract

SPECIAL TALK: COMPUTER SCIENCE/DISCRETE MATH III
Topic:

Speaker:

Affiliation:

Date:

Time/Room:

All known efficient algorithms for computing the determinant of a matrix rely on commutativity of the matrix entries. How important is this property, and could we make use of an algorithm that computes determinants without assuming commutativity?

In this talk I will discuss both aspects of this question:

1. If we could efficiently compute the determinant over a sufficiently rich lass of non-commutative algebras, then we would get an extremely simple and efficient approximation scheme for the permanent of a 0-1 matrix.

2. The algebraic branching program complexity of the determinant over almost any non-commutative algebra is exponentially large.

If one is a pessimist, these results suggest that non-commutative determinant computation would be nice but is hopelessly hard. If one is an optimist, they represent a challenge to devise a new approximation scheme for the permanent.

Joint work with Steve Chien and Lars Rasmussen.