Department of Mathematics and Statistics Colloquium

Generating Functions, Algorithms, and the Two-Stamp Problem

Abstract: We'll start with the following question: "Given two denominations of stamps, a cents and b cents, what is the largest postal rate that we cannot pay exactly?" This is called the Frobenius problem with two generators. Using generating functions, we'll get a nice formula for the answer.

Then we'll take a look at a wide variety of questions that we can answer using this same sort of generating function. In general, generating functions can often encode a seemingly complicated set (such as the set of postal rates that can be paid with a cent and b cent stamps) in a nice, compact form. Then we can use the generating functions to answer questions like "Is this set nonempty?" "What is its cardinality?" "What is its maximal element?" We'll build up a theory of what can be done with generating functions, and we will approach these problems from an algorithmic perspective: what can we do quickly (that is, in polynomial time)?

The speaker is a candidate for an open position in the Department of Mathematics and Statistics. For reasons of confidentiality, the speaker's name and institutional affiliation have been suppressed.

Thursday, January 26 at 3:15 in Roop 103

refreshments at 3:00