

MATHEMATICS DEPARTMENT COLLOQUIUM, CSU
3–4 PM THURSDAY¹ NOVEMBER 8, 2007
RHODES TOWER 1516

Solving Lattice Point Problems Using Rational Generating Functions

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Abstract. As an example, consider the following problem. Given positive integers a_1, \dots, a_d that are relatively prime, let S be the set of integers that can be written as a nonnegative integer combination of these a_i . We can think of the a_i as denominations of postage stamps and S as the postal rates that can be paid exactly using these denominations. What can we say about the structure of this set, S ? What is the largest integer not in S (called the Frobenius number)? How many positive integers are not in S ?

We attack these problems using the generating function $f_S(x)$, defined to be the sum, over all elements s of S , of the monomials x^s . We will build up the general theory of computing generating functions — for this and other problems — and then use these generating functions to answer questions we're interested in. We will approach these problems from an algorithmic perspective: what can we do in polynomial time?

Refreshments start at 2:30 PM in RT 1517.

¹Note a special day!