1139-52-88 **Jesus A. De Loera*** (deloera@math.ucdavis.edu), Dept. of Mathematics, University of California, One Shields Avenue, Davis, CA 95616. *Money problems and Affine Semigroups.*

Affine semigroups are the algebraic combinatorics analogues of convex polyhedral cones and appear convex geometry, algebraic geometry, and combinatorics. They can be written as $Sg(A) = \{b : b = Ax, x \in Z^n, x \geq 0\}$ and A is an integer $d \times n$ matrix. Of course if $d = 1$, A is just a list of coin values. Each such vector x is a {representation} of b in the semigroup $Sg(A)$ and, for $d = 1$, membership has a monetary meaning as a denomination one can make change for using the given coin values.

This talk is about two questions about the representations of the members of an affine semigroup in terms of its generators (i.e., the columns of A).

1) What is the set $Sg_{\geq k}(A)$ of all elements in the semigroup $Sg(A)$, that have {at least} k different representations?

2) For an element b of $Sg(A)$, what is its {sparsest} representation? I.e., one using the fewest possible generators.

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