Meeting: 1006, Lubbock, Texas, SS 6A, Special Session on Real Algebraic Geometry

1006-14-210 **Evgenia Soprunova*** (`esoprun@math.umass.edu`), 128 Cottage st., Amherst, MA 01002, and **Frank Sottile**. *Real solutions to real sparse polynomial systems.* Preliminary report.

We show how to construct sparse polynomial systems that have non-trivial lower bounds on their numbers of real solutions. These are unmixed systems associated to polytopes. In our first method we formulate such a system as a projection of a real toric variety, and the lower bound is the topological degree of that projection. This method works well for the order polytope of a poset P. In this case, the lower bound is the sign-imbalance of P and it holds if all maximal chains of P have length of the same parity. The second method is based on Khovanskii's formula for the index of an exponential vector field. (Received February 15, 2005)