1051-14-133   **Dan Bates*** (`bates@math.colostate.edu`), 101 Weber Building, Department of Mathematics, Colorado State University, Fort Collins, CO 80523, and **Frank Sottile**. *Khovanskii-Rolle continuation for real solutions of polynomial systems.*

Modern homotopy continuation methods provide an efficient and reliable means for collecting information about the *complex* solutions of a polynomial system. However, to find only the *real* solutions (those of most interest to scientists and engineers), the only option is to first find all complex solutions and then filter out those with nonzero imaginary part (where "zero" is some user-defined tolerance, which may lead to errors).

There is a new numerical method - Khovanskii-Rolle continuation - which will find only the real solutions. The complexity of this method relies on the number of real solutions rather than the number of complex solutions. The method relies on Gale duality (a transformation between a polynomial system and an equivalent system of master functions on the complement of a hyperplane arrangement) and Khovanskii's generalization of Rolle's Theorem. This talk will illustrate these concepts and the new method on appropriate examples. This is joint work with Frank Sottile. (Received August 21, 2009)