1001-68-204 **Koji Ouchi*** (`kouchi@cs.tamu.edu`), Department of Computer Science, Texas A&M University, College Station, TX 77843-3112, and **John Keyser**. *An Exact Toric Resultant-Based RUR Approach for Solving Polynomial Systems.*

We describe a method to solve a system of polynomial equations with rational coefficients in the exact Rational Univariate Representation (RUR) via toric u-resultants. In the exact RUR, every coordinate of solutions to the system is represented as some univariate polynomial (or rational function) evaluated at solutions to some other univariate polynomial and all the coefficients of these univariate polynomials (or rational functions) are computed in full digits. Exact computation is used in order to compute the solutions of a non-square system. The computation mostly consists of interpolations over the determinant of the u-resultant matrix in which indeterminates are specialized in several ways. We will show the incremental construction of the resultant matrix is most suitable for our purpose because 1) it produces the resultant matrix asymptotically smaller than the other method, and 2) we could avoid constructing the matrix whose determinant becomes identically zero due to the degeneracies of the system. (Received August 25, 2004)

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