Meeting: 1001, Evanston, Illinois, SS 9A, Special Session on Solving Polynomial Systems

1001-65-232   **Zhonggang Zeng*** (`zzeng@neiu.edu`), Department of Mathematics, Northeastern Illinois
University, 5500 N. St. Louis Avenue, Chicago, IL 60625. *Approximate GCD and Factorization of
Multivariate Polynomials.*

Computing the greatest common divisor (GCD) and factoring polynomials are basic polynomial algebra operations that are applicable to a broad range of problems. Due to ill-posedness, there is an inherent difficulty in calculating GCD and factorizations with finite precision arithmetic. By converting the problems in a least square setting, however, the ill-posedness can be removed, while the reformulated problems become well-posed and usually well conditioned. As a result, a robust algorithm is developed for computing the approximate GCD of multivariate polynomials with inexact coefficients. This algorithm naturally leads to algorithms for computing approximate polynomial factorizations, while its implementation appears to be the first robust software package capable of computing the approximate GCD numerically even if the polynomials are significantly perturbed. The algorithm, software, applications and numerical results will be presented in this talk. (Received August 27, 2004)