

1064-65-75

**Tianran Chen, Tsung-Lin Lee and T.Y. Li\*** ([li@math.msu.edu](mailto:li@math.msu.edu)), Department of Math,  
Michigan State University, East Lansing, MI 48824. *Parallel computation of the mixed volume.*

Calculating mixed cells which produces mixed volume as a by-product is the vital step in solving systems of polynomial equations by the polyhedral homotopy methods. Our original algorithm for this purpose, implemented in MixedVol-2.0, is highly serial. In this talk, we propose a reformulation of our algorithm, making it much more fine-grained and scalable. It can be readily adapted to both distributed and shared memory computing systems. Remarkably, very high speed-ups were achieved in our numerical results, and we are now able to compute mixed cells of polynomial systems of very large scale, such as “VortexAC6” system with mixed-volume 27,298,952 and total degree  $2^{30}$  (around 1 billion). (Received August 27, 2010)