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**Yun Guan\*** ([guan@math.uic.edu](mailto:guan@math.uic.edu)), Dept. of Math. Stat. and CS, University of Illinois at Chicago, 322 Science and Engineering Offices (M/C 249), Chicago, IL 60607, and **Jan Verschelde** ([jan@math.uic.edu](mailto:jan@math.uic.edu)), Dept. of Math. Stat. and CS, University of Illinois at Chicago, 322 Science and Engineering Offices (M/C 249), Chicago, IL 60607. *Local Numerical Representation of Algebraic Sets.*

Numerical data structures for positive dimensional solution sets of polynomial system are sets of generic points cut out by random planes. We may represent the linear spaces defined by those planes either by explicit linear equations or in parametric form. These descriptions are respectively called extrinsic and intrinsic representations. Previous work by Andrew Sommese, Jan Verschelde, and Charles Wampler showed how the intrinsic formulation of diagonal homotopies reduced the cost of the linear algebra operations during path following. However, we observe that intrinsic representation leads to worse condition numbers. By adapting intrinsic coordinates locally, we show that the conditioning is improved. This is a joint work with Jan Verschelde. (Received July 28, 2009)