1014-65-285 **Daniel J. Bates*** (dbates1@nd.edu), 255 Hurley Hall, University of Notre Dame, Notre Dame, IN 46556, and **Andrew J. Sommese** and **Charles W. Wampler**. *Adaptive precision in homotopy continuation.*

Over the past decade, many algorithms have been developed for the numerical irreducible decomposition of the solution sets of polynomial systems. These algorithms form the foundation of the field of numerical algebraic geometry. At the crux of all such algorithms lies the technique of homotopy continuation, a method for numerical path-following.

Homotopy continuation is straightforward and robust if the solution curves to be traced are not near singularities. However, in the presence of singularities, the necessary linear algebra operations grind to a halt due to a lack of numerical precision. Therefore, by increasing precision adaptively in such situations, one may have more success in path-tracking. In this talk, I will briefly describe the effects of ill-conditioning on homotopy continuation, a new technique involving adaptive precision path-tracking, and the implementation of this technique in the software package Bertini, which is being developed by the authors. (Received September 06, 2005)