

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

1001-14-94            **Wenyuan Wu\*** ([wwu25@uwo.ca](mailto:wwu25@uwo.ca)), Department of Applied Mathematics, University of Western Ontario, London, Ontario N6G5B8, Canada, and **Greg Reid** ([reid@uwo.ca](mailto:reid@uwo.ca)), Department of Applied Mathematics, University of Western Ontario, London, Ontario N6G5B8, Canada.  
*Determination of the dimension of a variety and some applications.*

In this paper we propose a new algorithm to determine the dimension of variety by homotopy method. Based on this algorithm we can implement some basic operations of varieties and radical ideal membership test. First part provides some background knowledge about algebra geometry such as ideal, variety, radical ideal and symbolic numerical method for computational algebra geometry. In Second part we will give more details about the main algorithm highestdim. In order to solve polynomial system more efficiently by PHC we choose subsystem to reduce the Bezout bound. Finally based on highestdim we build up some tools, such as dimension of projection variety, Radical Ideal Membership Test and equality of two varieties, for numerical algebra geometry.

Key words: variety, homotopy method, dimension, radical ideal, smallest generation of variety. (Received August 16, 2004)