1023-65-1520 **Jan Verschelde** (jan@math.uic.edu), Department of MCS, 851South Morgan(M/C 249), Chicago, IL 60607, and **Yan Zhuang*** (yzhuan1@math.uic.edu), Department of MCS, 851South Morgan(M/C 249), Chicago, IL 60607. *solving polynomial systems by parallel polyhedral homotopies.*

Homotopy methods to solve polynomial systems are well suited for parallel computing because the solution paths defined by the homotopy can be tracked independently. For sparse polynomial systems, polyhedral methods give efficient homotopy algorithms. The parallel implementation of the polyhedral homotopy methods need 3 stages: compute the mixed volume, solve a random coefficient start system and track solution paths to solve the target system. This paper is about how to parallelize the second stage in PHCpack. We use static workload distribution algorithm and achieve a good speedup on the cyclic n-roots benchmark systems. Dynamic workload balancing leads to reduced wall times on large polynomial systems which arise in mechanism design. (Received September 26, 2006)