1016-65-205   **Anton Leykin** (`leykin@math.uic.edu`), Department of Mathematics, Statistics, and Computer Science, 851 S. Morgan St. (MC 249), Chicago, IL 60607-7045, **Jan Verschelde*** (`jan@math.uic.edu`), Department of Mathematics, Statistics, and Computer Science, Chicago, IL 60607-7045, and **Yan Zhuang** (`yzhuan1@math.uic.edu`), Department of Mathematics, Statistics, and Computer Science, Chicago, IL 60607-7045. *Parallel Homotopy Algorithms to Solve Polynomial Systems.*

Homotopy continuation methods to compute numerical approximations to all isolated solutions of a polynomial system are known as "embarrassingly parallel", i.e.: because of their low communication overhead, these methods scale very well for a large number of processors. Because so many important problems remain unsolved mainly due to their intrinsic computational complexity, it would be embarrassing not to develop parallel implementations of polynomial homotopy continuation methods. The focus of this talk is the development of "parallel PHCpack", a project which started a couple of years ago in collaboration with Yusong Wang, and which currently continues with Anton Leykin (parallel irreducible decomposition) and Yan Zhuang (parallel polyhedral homotopies). We report on our efforts to make PHCpack ready to solve large polynomial systems which arise in applications. (Received February 13, 2006)

1