Algorithms of primary decomposition of polynomial ideals and their applications

Kazuhiro Yokoyama

High Performance Computing Research Center

FUJITSU LABORATORIES LIMITED

Abstract. We give a introductory lecture on the theory and algorithms of primary decomposition of polynomial ideals with emphasis on relations with algebraic constraints problems. First we show some important relation between primary (prime) decomposition of polynomial (radical) ideals and solutions of algebraic constraint problems, and show the current status on the practical computability briefly. Then for practical methods for actual computation, we give short discussions on three key techniques; reduction to 0-dimensional ideal, prime decomposition of 0-dimensional radical ideals and localization of polynomial ideals.