

Numerical algebraic geometry for complex affine schemes

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Algorithms for {\em numerical irreducible decomposition} of a complex affine variety defined by a polynomial ideal determine only isolated components of the underlying scheme. The {\em numerical primary decomposition} is able to output a set of {\em suspect} components that contains the embedded components and the so-called pseudo-components. A major hurdle to understanding whether numerical methods are applicable to schemes was: How to test numerically whether a suspect is an embedded component?

Our work provides an algorithm to answer this question in the most general case as well as several more specialized algorithms.