

Talk Abstract

Given an analytic function f defined over a compact domain $X \subset \mathcal{R}^n$, and that is assumed to be *Morse*, identify all local minima of f located in the interior of X . The approach we put forward is global and consists in three main steps: we first approximate f by a polynomial, which we construct by iteratively increasing degrees, until a satisfying approximant w is obtained. The numerical construction of algebraic approximants of f is a challenging computational task in itself. Finally, we initialize local optimization methods on f at those points, in order to recover all local minima of f . We then solve for the real vanishing locus of the ideal of partial derivatives of w using exact method from computer algebra. In this talk we will cover some of the results on the accuracy and the probabilistic and stability aspects of computing accurate polynomial least-squares approximations and how they can be used to compute critical points of f .