ERROR BOUNDS FOR PARAMETRIC POLYNOMIAL SYSTEMS WITH APPLICATIONS TO HIGHER-ORDER STABILITY ANALYSIS AND CONVERGENCE RATE

GUOYIN LI

Abstract. In this talk, we consider parametric inequality systems described by polynomial functions in finite dimensions, where state-dependent infinite parameter sets are given by finitely many polynomial inequalities and equalities. Such systems can be viewed, in particular, as solution sets to problems of generalized semi-infinite programming with polynomial data. Exploiting the imposed polynomial structure together with powerful tools of variational analysis and semialgebraic geometry, we establish an extension of the Lojasiewicz gradient inequality to the general nonsmooth class of supremum marginal functions as well as higher-order (Holder type) local error bounds results with explicitly calculated exponents. The obtained results are applied to higher-order quantitative stability analysis for various classes of optimization problems including generalized semi-infinite programming with polynomial data, optimization of real polynomials under polynomial matrix inequality constraints, and polynomial second-order cone programming. Other applications provide explicit convergence rate estimates for the cyclic projection algorithm to find common points of convex sets described by matrix polynomial inequalities and for the asymptotic convergence of trajectories of sub-gradient dynamical systems in semi-algebraic settings.

This is a joint work with B.S. Mordukhovich, T. A. Nghia and T.S. Pham.