

Departamento de Matemáticas

Numerically Certifiable Mathematics for Convex Optimization: new and old

Abstract: Convex optimization problems is ubiquitous across science and engineering. It has found applications in a wide range of disciplines such as automatic control systems, signal processing, data analysis, statistics and finance. Despite the great success of theoretical/algorithmic development and its wide application, convex optimization problems are, in general, NP-hard to solve from complexity point of view. Moreover, validating many of its associated properties of convex optimization is a non-trivial and challenging task. Therefore, developing mathematical criteria for convex optimization and some of its associated quantity, which can be efficiently numerically validated, has become an interesting and crucial task recently.

In this talk, I will present some progresses along this direction and discuss two recent work based on semi-definite programming techniques : one on radius of robust feasibility of conic program under data uncertainty, and the other one on a new tractable class of non-smooth convex optimization problems called sums-of-squares-convex semi-algebraic optimization problems.

These are based on joint work with N.H. Chieu, W. Gao, M.A. Goberna, V. Jeyakumar, L.Q. Qi, and D. Wu.

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