Static and Dynamical Polynomial Optimization

Victor MAGRON, CNRS-LAAS

In 2001, Lasserre introduced a hierarchy [1] of convex relaxations to approximate the solution of polynomial optimization problems. The emergence of this exciting new field goes back to the last decade and has led to striking developments from a cross fertilization between (real) algebraic geometry, applied mathematics, theoretical computer science and engineering. Lasserre's hierarchy has been extended to approximate various sets of interest in optimization and control, including semialgebraic sets [2], regions of attraction [3], maximum controlled invariants, reachable sets. The hierarchy also allows to compute approximate solutions of optimal control problems involving ordinary or partial differential equations. We will present recent frameworks addressing static/dynamical polynomial optimization problems, relying either on Lasserre's hierarchy or alternative schemes based on convex programming.

Liste des orateurs

- Victor Magron
- Swann Marx
- Simone Naldi
- Matteo Tacchi

Références

[1] J.-B. Lasserre. Global Optimization with Polynomials and the Problem of Moments. SIAM Journal on Optimization, 11(3):796–817, 2001.

[2] D. Henrion, J. Lasserre, and C. Savorgnan. Approximate Volume and Integration for Basic Semialgebraic Sets. *SIAM Review*, 51(4):722–743, 2009.

[3] D. Henrion, M. Korda. Convex Computation of the Region of Attraction of Polynomial Control Systems. IEEE Transactions on Automatic Control, 59(2):297–312, 2014.

Victor MAGRON, CNRS-LAAS, 7 avenue du colonel Roche, F-31400 Toulouse France
vmagron@laas.fr