Complexity in Polynomial Optimization: Asymptotic Convergence, Flat Trucation and Semidefinite Programming

Lorenzo Baldi
Sorbonne University, France
Lorenzo.Baldi@lip6.fr

In polynomial optimization, the Lasserre-Parrilo hierarchies are used to compute lower approximations of the global minimum of a polynomial objective funciton f over a basic closed semialgebraic set S. In this talk, we investigate three aspects of the complexity of such problems:

- we present asymptotic convergence rates for the lower approximations of the global minimum, using Lojasiewicz inequalities associated to f and to the description of S;

- we characterize flat truncation, that is used to certify finite convergence, and we describe the relationship with the interpolation degree and the support of finitely generated quadratic modules;

- we propose open research directions connecting polynomial optimization with the complexity of semidefinite programming problems.

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