

Interacting Particle Systems for Optimization: from Particle Swarm Optimization to Consensus-based Optimization

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Abstract

In this talk, we delve into the application of metaheuristics via extensive systems of interacting particles to tackle complex optimization problems, starting from the Particle Swarm Optimization (PSO) method. This technique leverages collective intelligence, where individual particles adapt their trajectories based on their own success and the influence of their neighbors, directing the swarm toward the optimal solution. We will investigate the continuous model proposed by Grassi and Pareschi, providing evidence of its convergence to global minimizers and illustrating its relationship to Consensus-Based Optimization (CBO) in the limit of zero inertia. The talk is based on joint works with Cristina Cipriani and Hui Huang.

*Punctual, i.e. sine tempore!