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An Observer-based Approach to Continuous-Time Distributed Optimization

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About the speaker

Bahman Gharesifard is an Assistant Professor with the Department of Mathematics and Statistics, Queen's University, Canada. Prior to joining Queen's, he was a Postdoctoral Research Associate with the Coordinated Science Laboratory (CSL) at the University of Illinois, Urbana-Champaign (2012-2013) and Postdoctoral Researcher at the Cymer Center for Controls and Dynamics at the University of California in San Diego (2009-2012). He received a PhD degree in Mathematics from Queen's University, Canada, in 2009. His research interests include systems and controls, distributed optimization, social and economic networks, game theory, geometric control and mechanics, and Riemannian geometry.

Abstract

In this talk, we give an overview of different classes of continuous-time dynamical systems that solve the distributed optimization problem. We demonstrate how such a continuous-time dynamical system can be formulated as a distributed control system, where the control input to the dynamics of each agent relies on an observer that estimates the average state. Using this observation, and by incorporating a continuous-time version of the so-called push-sum algorithm, we relax the graph theoretic conditions (in particular, for time-varying settings) under which the trajectories of such continuous-time distributed optimization algorithms are asymptotically convergent to the set of optimizers.

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