Department of Electrical and Computer Engineering

Title: A zero-finding approach to distributed convex optimization

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Abstract: Distributed optimization has rapidly become a popular research topic, and over the years several approaches have been developed, with applications ranging from sensor networks to smart grids and to mobile robotics, to name a few.

In this talk, I will present a framework, namely *zero-finding approach*, for solving convex optimization problems in a distributed way, and I will discuss recent and ongoing research efforts on this issue.

The main idea of this approach is that, by directly exploiting the KKT first order optimality conditions, solving a convex optimization problem is equivalent to finding a zero of a function of both the decision variables and the Lagrange multipliers. This shift of perspective is particularly interesting in the case of inequality constraints, as the framework directly allows to handle complementary slackness conditions, which require Lagrange multipliers to be zero when the corresponding constraint is not tight. Moreover, the zero-finding approach ca be the basis to implement tracking algorithms for time-varying distributed algorithms or to deal with communication delays.

Biography: Prof. Gabriele Oliva received the M.sc and the Ph.D. degrees in computer science and automation engineering from the University Roma Tre of Rome, Italy, in 2008 and 2012, respectively. He is currently an Associate Professor in automatic control with the University Campus Bio-Medico of Rome, Italy. Since 2019, he serves as an Associate Editor for the Conference Editorial Board of the IEEE Control Systems Society. Moreover, since 2020, he serves as an Academic Editor for the journal PLOS ONE on subject areas such as Systems Science, Optimization and Decision Theory. Finally, since 2022 he is an Associate Editor for the IEEE Control Systems Letters Journal. His main research interests include distributed multi-agent systems, optimization, decision-making and critical infrastructure protection.