June 14th, 2022, 3:00 p.m., MaLGa Center – Dibris, via Dodecaneso 35, Genova.

Statistical Learning and Optimization

Graph and distributed extensions of the Douglas-Rachford method

Abstract.

We propose several generalizations of the Douglas-Rachford method to solve monotone inclusion problems involving N maximal monotone operators. In particular, our objective is to show that, starting from a directed connected graph with a topological ordering, it is possible to construct a generalization of the Douglas-Rachford algorithm with a communication structure that respects the connections of such a graph. We describe our methods in the (degenerate) Preconditioned Proximal Point framework and, in this way, we are able to prove convergence of every derived algorithm in a unifying way. Specifically, we show that the proposed methods are instances of the proximal point algorithm. We further describe how the graph extension of the DRS method can be leveraged to design new fully distributed protocols. Applications to a congested optimal transport problem and to distributed Support Vector Machines show interesting connections with the underlying graph topology and competitive performances with state-of-art distributed optimization approaches.

Speaker

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I am a Ph.D. student working at TU Braunschweig, in Germany. I studied mathematics (Bachelor and Master degree) in Pavia, Italy, with a particular focus on topics such as Calculus of Variations and Optimal Transport. My current research activity is on devising new splitting methods in the context of convex optimization with a particular interest in massive splitting.

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