FUDAN UNIVERSITY

Applied Math Ph.D. Seminar

A Distributed Optimization Approach to Dominant Singular Value Decompositions

Speaker: Lei Wang (ICMSEC)

Time: 2021-09-27, 16:10 to 17:00

Location: Rm 1801, Guanghua East Tower

Advisor: Xin Liu (ICMSEC)

Abstract: In this talk, we propose and study a distributed algorithm for computing dominant (or truncated) singular value decompositions (SVD) of large and distributed data matrices by solving an optimization problem with orthogonality constraints. We consider a centralized network in which each node privately holds a subset of columns and only exchanges "safe" information with a center server, directly or indirectly, in a collaborative effort to calculate a dominant SVD for the whole matrix. In the framework of alternating direction methods of multipliers (ADMM), we propose a novel formulation for building consensus by equalizing subspaces spanned by splitting variables instead of equalizing the variables themselves. This technique greatly relaxes feasibility restrictions and accelerates convergence significantly, while at the same time yielding simple subproblems.