FUDAN UNIVERSITY

Applied Math Ph.D. Seminar

A Homogeneous Second-Order Descent Method for Nonconvex Optimization

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Time: 2023-05-04, 16:10 to 17:00

Location: Rm 1801, Guanghua East Tower

Advisor: Bo Jiang

Abstract: In this paper, we introduce a Homogeneous Second-Order Descent Method (HSODM) using the homogenized quadratic approximation to the original function. The merit of homogenization is that only the leftmost eigenvector of a gradient-Hessian integrated matrix is computed at each iteration. Therefore, the algorithm is a single-loop method that does not need to switch to other sophisticated algorithms, and is easy to be implemented. We show that HSODM has a global convergence rate of $O(\epsilon^{-3/2})$ to find an approximate second-order stationary point, and has a local quadratic convergence rate under the standard assumptions. The numerical results demonstrate the advantage of the proposed method over other second-order methods.