



復旦大學
FUDAN UNIVERSITY

Applied Math
Ph.D. Seminar

A modified primal-dual algorithm for structured convex optimization with a Lipschitzian term

Speaker: Chao Yin (Nanjing University)

Time: 2023-03-30, 16:10 to 17:00

Location: Rm 1801, Guanghua East Tower

Advisor: Junfeng Yang

Abstract: We consider structured convex optimization problems consisting the sum of three terms — two nonsmooth terms, one of which is composed with a linear operator and both nonsmooth functions are proximal-friendly, and a smooth term with Lipschitzian gradient. To solve such problems, we propose and analyze a modified primal-dual splitting algorithm, denoted by MPD3O. MPD3O handles the smooth function by gradient evaluation, the nonsmooth functions by their proximity mappings and alleviate the computational burden in updating the primal variables by adding some extra costs to the updates of dual variables. Hence, MPD3O allows a much greater range of parameters to ensure convergence. Moreover, it does not need to calculate the spectral norm of the linear operator to determine the stepsizes. The global iterate convergence is established following the famous Krasnoselskii–Mann theorem, as well as ergodic and nonergodic $\mathcal{O}(1/k)$ convergence rate results, where k denotes the iteration counter. Numerical experiments on the constrained LASSO problem are conducted to show the efficiency of the proposed algorithm.