HONGDA LI, University of British Columbia

Relaxed Weak Accelerated Proximal Gradient Method: A Unified Framework for Nesterov's Accelerations

This paper is devoted to the study of accelerated proximal gradient methods where the sequence that controls the momentum term doesn't follow Nesterov's rule. We propose a relaxed weak accelerated proximal gradient (R-WAPG) method, a generic algorithm that unifies the convergence results for strongly convex and convex problems where the extrapolation constant is characterized by a sequence that is much weaker than Nesterov's rule. Our R-WAPG provides a unified framework for several notable Euclidean variants of FISTA and verifies their convergences. In addition, we provide the convergence rate of the strongly convex objective with a constant momentum term. Without using the idea of restarting, we also reformulate R-WAPG as "Free R-WAPG" so that it doesn't require any parameter. Explorative numerical experiments were conducted to show its competitive advantages.

(Joint Work with Xianfu Wang.)