THE UNIVERSITY OF HONG KONG

Institute of Mathematical Research
Department of Mathematics

Optimization and Machine Learning Seminar

Riemannian Proximal Gradient Methods

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Abstract

In the Euclidean setting, the proximal gradient method and its accelerated variants are a class of efficient algorithms for optimization problems with decomposable objective. In this paper, we develop a Riemannian proximal gradient method (RPG) and its accelerated variant (ARPG) for similar problems but constrained on a manifold. The global convergence of RPG has been established under mild assumptions, and the O(1/k) is also derived for RPG based on the notion of retraction convexity. If assuming the objective function obeys the Rimannian Kurdyka-Lojasiewicz (KL) property, it is further shown that the sequence generated by RPG converges to a single stationary point. As in the Euclidean setting, local convergence rate can be established if the objective function satisfies the Riemannian KL property with an exponent. Moreover, we have shown that the restriction of a semialgebraic function onto the Stiefel manifold satisfies the Riemannian KL property, which covers for example the well-known sparse PCA problem. Numerical experiments on random and synthetic data are conducted to test the performance of the proposed RPG and ARPG. (Joint work with Wen Huang from Xiamen University)

Date:	April 29, 2022 (Friday)
Time:	10:00 - 11:00am (Hong Kong Time)
Venue:	ZOOM: https://hku.zoom.us/j/ Meeting ID: 997 3327 4432 Password: 646089

All are welcome