



The Hong Kong University of Science & Technology

Department of Mathematics

PhD Student Seminar

**Global Recovery of Low Rank Matrix
Related Problems**

by

Ms. Zhenzhen LI

Abstract

Non-convex optimization is widely involved in many machine learning problems, and it usually implicates a two-stage algorithm: a refined initialization followed by a local gradient search. Even though recent studies in global geometric analysis have revealed that empirical loss function of many low-rank related problems have favourable landscape in parameterized Euclidean space, it is generally difficult to analyze. In this talk, I will discuss a new unified framework for the analysis of low-rank matrix recovery problems. Instead of classical parameterization in Euclidean space, we considers empirical least square loss function on the manifold of low-rank matrices directly. We show that (1) if the measurement operator satisfies RIP condition with constantly small enough, there would be no spurious critical points, and manifold gradient descent would generate linear convergent sequence to global minimum (e.g. matrix sensing); (2) under weaker assumptions, but with RIP-like distance-preserving condition, global linear convergence rate to local minimum is still guaranteed (e.g. phase retrieval).

Date: Friday, 12 July 2019

Time: 10:00 a.m. - 11:00 a.m.

**Venue: Room 5506, Academic Building,
(near Lifts 25-26), HKUST**

All are welcome!