



THE HONG KONG UNIVERSITY OF SCIENCE & TECHNOLOGY

Department of Mathematics

SEMINAR ON APPLIED MATHEMATICS

Randomized Orthogonal Matching Pursuit Algorithm with Adaptive Partial Selection for Sparse Signal Recovery

By

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Abstract

The orthogonal matching pursuit (OMP) algorithm, known for its exceptional ability to reconstruct sparse signals, is a widely employed algorithm in compressed sensing. Numerous studies have provided theoretical analyses supporting its capability for achieving exact recovery. However, when applied to large-scale sparse signal recovery, the OMP algorithm incurs substantial computational overhead, leading to prolonged running time. To address this challenge, in this talk, we will introduce a Randomized OMP with Adaptive Partial Selection (AROMP) algorithm to mitigate computational overhead and reduce runtime. The novelty of the AROMP algorithm lies in its utilization of a randomized index selection method rather than a greedy approach to select the index in each iteration. Subsequently, we will theoretically characterize the gap between AROMP and OMP for exactly recovering an s -sparse signal and show that the gap decreases as the number of comparisons K increases, sparsity s decreases, or signal dimension n decreases. We will also show some experimental results to illustrate the efficiency and effectiveness of our proposed method on sparse signal recovery, face recognition tasks, and image reconstruction tasks. This is joint work with Changhao Li, Qianyu Shu and Zhengchun Zhou.

Date : 25 July 2025 (Friday)

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

Venue : Room 4504 (Lift 25/26)

All are Welcome!