



THE HONG KONG UNIVERSITY OF SCIENCE & TECHNOLOGY

Department of Mathematics

SEMINAR ON APPLIED MATHEMATICS

**The local Minimax methods for
finding saddle points of semilinear partial
differential equations**

By

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Abstract

In this talk, we will systemically introduce several monotone and non-monotone local Minimax methods (LMM) for finding saddle points of semilinear partial differential equations and their corresponding algorithm framework. Among them, the monotone LMMs are based on Armijo, Goldstein and (strong) Wolf-Powell search rules, respectively with some more general descent direction rather than the steepest descent directions used in the classical LMMs. The extension of the descent direction makes it possible to accelerate the LMMs. On the other hand, the non-monotone LMM is based on the BB-stepsizes and Zhang-Hager-type monotone search strategy, with the numerical results showing that it can improve the efficiency dramatically. Our work overcome some essential difficulty of computing saddle points of semilinear partial differential equations, e.g., non-linearity, non-convexity, multiplicity and instability, and prove the feasibility and global convergence of these approaches. Further, the LMMs are used to compute the saddle points of a typical singularly perturbed semilinear partial differential equations with Neumann boundary conditions, with an important critical perturbed value found and then proved.

Date : 07 August 2024 (Wednesday)

Time : 11:00a.m.-12:00noon

Venue : Room 4503 (Lift 25/26)

All are Welcome!