THE HONG KONG POLYTECHNIC UNIVERSITY
香港理工大學

DEPARTMENT OF APPLIED MATHEMATICS
應 用 數 學 系

Department of Applied Mathematics Seminar

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Topic

Unique solvability and convergence analysis of the Lagrange multiplier approach for gradient flows

Date | Time

3 Jun 2025 (Tuesday) | 10:00 – 11:00 (HK Time)

Meeting ID | Password

870 3840 0108 | 0603

Zoom Link

https://polyu.hk/dbwxA

Abstract:

The unique solvability analysis and error estimate of the Lagrange multiplier approach for gradient flows is theoretically analyzed. We identify a necessary and sufficient condition that has to be satisfied for the nonlinear algebraic equation arising from the original Lagrange multiplier approach to admit a unique solution in the neighborhood of its exact solution. In turn, a modified Lagrange multiplier approach is proposed so that the computation can continue even if the aforementioned condition is not satisfied. Using Cahn-Hilliard equation as an example, we rigorously establish the unique solvability analysis and optimal error estimates of a second-order Lagrange multiplier scheme assuming this condition and that the time step size is sufficiently small.

ALL ARE WELCOME