



THE HONG KONG UNIVERSITY OF SCIENCE & TECHNOLOGY

Department of Mathematics

SEMINAR ON APPLIED MATHEMATICS

Inverse problems in phase field systems: uniqueness and algorithm

By

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Abstract

The phase field system is a nonlinear model that has significant applications in the field of materials science. In this talk, we are concerned with the uniqueness of determining the nonlinear energy potential in a phase-field system consisted of Cahn-Hilliard and Allen-Cahn equations. This system finds widespread applications in the development of alloys engineered to withstand extreme temperatures and pressures. The goal is to reconstruct the nonlinear energy potential through the measurements of concentration fields. We establish the local well-posedness of the phase-field system based on the implicit function theorem in Banach spaces. Both of the uniqueness results for recovering time-independent and time-dependent energy potential functions are provided through the higher order linearization technique. Numerical verifications based on the combination of semi-implicit Fourier scheme and neural network are presented in the end.

Date : 11 July 2025 (Friday)

Time : 3:00p.m.-4:00p.m.

Venue : Room 2463 (Lift 25/26)

All are Welcome!