



THE HONGKONG UNIVERSITY OF SCIENCE & TECHNOLOGY

Department of Mathematics

SEMINAR ON APPLIED MATHEMATICS

**On determining the critical perturbation values to
a type of singularly perturbed Neumann problems**

By

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Abstract

Based on the analysis of bifurcation points and Morse indices of trivial solutions at any perturbation value for a type of semi-linear singularly perturbed Neumann boundary value problems, the exact critical perturbation value which determines the existence or nonexistence of nontrivial positive solutions is obtained. As a result, the generating process of nontrivial positive solutions is studied and further used to guide algorithm design and numerical computation. An improved local minimax method is then proposed accordingly to compute both M-type and W-type saddle points by using an adaptive local refinement strategy and a Newton method to overcome singularity difficulty and accelerate local convergence. Extensive numerical results are reported to justify the critical perturbation value and investigate some interesting solution properties for several typical problems.

Date : 21 February 2025 (Friday)

Time : 3:00pm - 4:00pm

Venue : Room 5506 (Lift 25/26)

All are Welcome!