For favour of Posting

THE HONG KONG UNIVERSITY OF SCIENCE & TECHNOLOGY

Department of Mathematics

SEMINAR ON APPLIED MATHEMATICS

An approximate-ball-based FEM for nonlocal problems and its analysis and applications

By

Prof Jiwei Zhang

Wuhan University

Abstract

The nonlocal model is a mathematical and physical model established based on nonlocal effects, with peridynamics being a typical example. Peridynamics consistently has been an important research direction in the field of computational mathematics. The finite element implementation of fully three-dimensional nonlocal models involves high-dimensional integrals, enormous computational and storage requirements, thus posing significant computational challenges in various aspects, including algorithm design, mesh generation, data structure optimization, and algorithm architecture for parallel platforms on CPUs and GPUs. This report will briefly introduce our efforts and attempts in developing high-precision finite element algorithms based on the approximation-ball strategy for peridynamics, matrix-free solution algorithms, and their high-performance implementations. Furthermore, these high-performance finite element algorithms will be applied to material fracture simulations based on peridynamics.

Date : 17 July 2025 (Thursday)

Time : 10:30a.m.-11:30a.m.

Venue : Room 4502 (Lift 25/26)

All are Welcome!