



THE HONG KONG UNIVERSITY OF SCIENCE & TECHNOLOGY

Department of Mathematics

PHD STUDENT SEMINAR

A Moving Mesh Finite Element Method for Topology Optimization

By

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Abstract

Many partial differential equations may have solutions with nearly singular behaviors, such as shock waves and boundary layers. This can lead to the inefficiency of discretizing the functions using uniform mesh when numerical methods are applied, because very fine mesh is required to resolve the solution behavior in the nearly singular regions. In these cases, a nonuniform adaptive mesh is preferred, where a higher proportion of points are clustered only where there is large solution variation. We consider the r-refinement (moving mesh) methods, the idea of which is to relocate the existing nodes under certain criteria during numerical computation, and the PDEs are discretized on the moving mesh. We first review the techniques in the moving mesh finite element methods, and then give an application of moving mesh methods to structure topology optimization, where the adaptive finite element meshes are concentrated near the boundary of material in the process of optimization, which can accurately capture the boundary position with fewer mesh points required.

Date : 4 May 2022 (Wednesday)

Time : 10:30am

Zoom Meeting : <https://hkust.zoom.us/j/97869196697> (Passcode: 331277)

All are Welcome!