



THE HONG KONG UNIVERSITY OF SCIENCE & TECHNOLOGY

Department of Mathematics

PHD STUDENT SEMINAR

**An adaptive iterative convolution thresholding
method for topology optimization**

By

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Abstract

Topology optimization has become progressively important as a tool for engineering structural designs due to advancing manufacturing technology and increasing computational power. We propose an efficient adaptive iterative convolution thresholding method for topology optimization in fluids modeled by the Darcy-Stokes flow with presence of volume source. The method is based on the minimization of total potential energy. The fluid region is represented by its characteristic function and total potential energy is approximated under this representation. The topology optimization problem can then be approximately solved by adaptively alternating: 1. Solving a Brinkman equation to model Darcy-Stokes flow and 2. Updating the characteristic function by a simple convolution followed with thresholding step. We prove mathematically that the resulting algorithm has the desired total energy decaying property. We present numerous numerical experiments to show the performance of the method.

Date : 27 Aug 2020 (Thursday)

Time : 10:00am – 11:00am

Zoom Meeting : <https://hkust.zoom.us/j/94968680469>

All are Welcome!