



The Hong Kong Polytechnic University Department of Applied Mathematics

Colloquium

A Novel Approach to Discrete Truss Design Problems

by

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Abstract

Discrete truss sizing problems are challenging to solve due to their combinatorial, non-linear, and non-convex nature. Consequently, truss sizing problems become unsolvable as the size of the truss grows.

In this presentation, we focus on modeling and efficiently solving discrete truss sizing problems, where the cross-sectional areas of the bars take only discrete values. We consider various mathematical formulations with the objective to minimize the truss weight. The non-convex Euler buckling constraints and Hooke's law are also considered.

We propose novel Mixed Integer Linear Optimization (MILO) reformulations of the non-convex models. The resulting MILO models, for large real world trusses, are not solvable with existing MILO solvers.

We propose a novel solution methodology to solve the MILO models, and present encouraging computational results which demonstrate the power of the novel computational methodology.

Date : 13 March, 2018 (Tuesday)

Time : 3:00p.m. – 4:00p.m.

Venue : TU801, The Hong Kong Polytechnic University

*** * * ALL ARE WELCOME * ***