

Department of Mathematics and Statistics Colloquium

Numerical Optimization: interesting applications and recent research

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Abstract: My presentation will be in two parts. First, I give an overview of several interesting real life problems that require the intellect of a 3rd grader (okay, a bit of an exaggeration!) to understand, and the skill set of an advanced numerical optimizer to solve. Specific problems include optimal shape design subject to certain given constraints (a Civil Engineering application), the pricing of certain so-called American options (a Financial Engineering application), speech recognition on your smart phone or other device (a Computer Science application related to Machine/Statistical Learning), and finally an application related to computer gaming graphics (a Computational Mechanics application).

In the second part of my talk, I will present recent research that introduced the first two-phase algorithm for solving an asymmetric linear complementarity problem (aLCP) that has convergence guarantees; the aLCP framework is the key mathematical model used to price (certain) American options and creating computer games with realistic physics. An aLCP is strictly NOT an optimization problem, but nonetheless I tackle the problem by using certain techniques that have been successful in the optimization community.

Monday, April 8 at 3:45 in Roop 103
refreshments at 3:30