Optimization Seminar

(Joint with PIMS-Lethbridge Seminar in Optimization)

Date: Wednesday, Oct 09, 2013
Time: 13:00 - 13:45
Location: E575

SPEAKER: Mark Thom

Title: COLUMN GENERATION

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Abstract: A linear program is an optimization problem of the form

$$\text{maximize } cx \text{ (the objective function)}$$
$$\text{subject to the constraints } Ax \leq b,$$
$$x \geq 0$$

where c and x are vectors and A is a matrix, referred to as the constraint matrix. The simplex method is a popular algorithm for solving linear programs. It is efficient in the number of variables to be optimized, but requires the entirety of A to be known at computation time. For linear programs over many variables, the space required for the storage of A can easily exceed the amount of physical memory on available computers, rendering the simplex method impractical in those cases.

Column generation is a technique which circumvents the space requirements of the conventional simplex method, allowing for the efficient computation of large linear programs. After explaining the simplex method in terms of basic linear algebra, we will develop the column generation algorithm by making a few easy changes to the simplex method. A simple motivating example will be given.

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