Operations Research Seminar

Monotone IP Formulations for Clustering and Alert Systems for Homeland Security and Image Segmentation Applications

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Thursday, November 12, 2009
16:00-17:00 in GL-122
Refreshment 15:45-16:00 in GL-239

Modeling of problems often entails flexibility in the choice of model. We present a methodology, relying on previous work on monotone linear and integer programs, that addresses several known problems in clustering and imaging, and solves them in polynomial time. These problems are particularly of interest, as some of them they were thought to be NP-hard. The formulations reveal easily the fact that the problems can be solved in polynomial time, and in most cases, as minimum cut solution on an associated graph that is constructed from the formulation.

We will provide examples including: the normalized cut problem, the ratio regions problem, the max and min density problems, and the co-segmentation problem. We will demonstrate uses of these techniques for homeland security applications and image segmentation.
