Linear Programming and its uses in Algorithm Design

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Abstract. Linear programming has a rich history. In this talk, we focus on its use in algorithm design. We will look at its use in three areas. The first is the design of exact algorithms, and the second is the design of approximate algorithms. Thirdly, its use in the creation of practical algorithms for computationally challenging problems. I will give several examples of how researchers in my group use linear programming to develop exact and approximate algorithms. These illustrative examples will also highlight the computational challenges still remaining. Most of the theory that will be covered is explained nicely in these books [Dantzig and Thapa, 2006; Vazirani, 2003; Lau et al., 2011; Cook et al., 1998]. This talk will be a little tour of the strengths of linear programming and how to use them. This introductory talk will be a mix of theory and practice and no background is assumed.