The University of Chicago

Department of Statistics

Master's Thesis Presentation

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A Hierarchy of Bounds for Multistage Stochastic Mixed-Integer Programs

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ABSTRACT

Various statistical estimation problems, such as M-estimation, are closely related to a certain class of problems in stochastic programming. Moreover, stochastic programming is used to model decision making in the real world with various constraints imposed on the problem. This paper presents the solution methods for multistage discrete stochastic mixed-integer programs. Stochastic mixed-integer programs are difficult to solve due to the rapid increase in the size of the sample space. We generalize earlier solution methods to develop a hierarchy of lower and upper bounds for the optimal objective value by using a subset of the distribution information. As we incorporate more distributional information, the bounds become progressively stronger but, generally, more difficult to compute. Our numerical results indicate that the bounds developed in this paper can be quite strong relative to the earlier bounds.

Motivating example and formal problem formulation will be given, after which the lower and upper bounds will be defined, as well as their properties proved. If time allows, implementation details will also be discussed.

Information about building access for persons with disabilities may be obtained in advance by calling Sandra Romero at 773.702-0541 or by email (sandra@galton.uchicago.edu).