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Simulation-Based Two-Stage Stochastic Programming with Recourse

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Abstract

In this paper we provide a simulation-based approach to solve two-stage stochastic problems with recourse. By adopting a simulation-based approach we are able to simultaneously solve for the expected recourse function and optimal first stage decision by calculating the mode of a suitably defined joint probability distribution. Both decision and stochastic uncertainty variables are treated as random. We can directly use Markov chain Monte Carlo (MCMC) simulation algorithms such as Metropolis-Hastings for our non-standard joint probability distribution. We illustrate the accuracy of our approach in a one stage stochastic problem and in two-stage recourse problems with both discrete and continuous uncertainty.

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