

# Efficient weight generation for simulation-based multiple criteria decision analysis

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## Abstract

Models for Multiple Criteria Decision Analysis (MCDA) often separate per-criterion attractiveness evaluation from weighted aggregation of these evaluations across the different criteria. In simulation-based MCDA methods, such as Stochastic Multicriteria Acceptability Analysis, weights can be defined through a uniform distribution on the weight space, or a region of the weight space bounded by linear constraints. Efficient sampling methods have been proposed for special cases, such as the unconstrained weight space or complete ordering of the criteria. However, no efficient methods are available for other constraints such as imprecise trade-off ratios, and specialized sampling methods do not allow for flexibility in combining the different constraint types. In this paper, we propose a Markov Chain Monte Carlo technique for sampling from the convex weight space that results from an arbitrary combination of linear weight constraints. Computational tests show that the new technique is fairly efficient and generates sufficiently uniformly distributed samples.