"Hit and Run" for the efficient generation of weights

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Abstract

Multi-criteria decision analysis is often based on weighted aggregation of per-criterion scores, where weights represent preferences. To enable specifying preferences as linear constrains on the weights, simulation-based methods sample from a uniform distribution on the feasible weight space. Efficient samplers are known for special cases, but no method can efficiently sample weights with general linear constraints. We show how the "Hit and Run" sampler can be used to perform this type of sampling in fast polynomial time. We also discuss the problem of diagnosing convergence of such samplers.