

1077-65-1472

Sanjay Mehrotra and **David Papp*** (dpapp@iems.northwestern.edu), 2145 Sheridan Rd, C210, Evanston, IL 60208. *Finding moment-matching cubature formulas using optimization techniques, with applications in stochastic optimization.*

Stochastic optimization problems translate to finding the optimal value of a function that is expressible as an integral of some given function. These integrands are often high-dimensional, and sometimes expensive to compute; however, they often have a sparse structure or other special characteristics that may be exploited by numerical methods. Consequently the traditional cubature formulas, which use a large number of points and are aimed at matching all moments of the underlying measure up to a certain degree, are insufficient to approximate these integrals. We propose a flexible method based on convex optimization that can generate cubature formulas that match any prescribed set of moments, and thereby exploit the special properties of the integrand. The method is compared to Monte Carlo and quasi-Monte Carlo methods on both integration and stochastic optimization problems. (Received September 19, 2011)