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(mkoeppe@math.ucdavis.edu), University of California, Davis, Department of Mathematics, One Shields Avenue, Davis, CA 95616, and **Michèle Vergne**. *Efficient exact integration of polynomials over polytopes.*

We study the theoretical and practical efficiency of exact integration procedures for polynomial functions over simplices. Exact (and approximate) integration is a hard problem, as we show by relating it to a hard combinatorial optimization problem.

The methods we study are related to Brion's formulas, Barvinok's exponential sums, polarization of polynomials, and also to the polynomial Waring problem that asks to represent a polynomial as a sum of powers of few linear forms. (Received February 09, 2009)