



THE UNIVERSITY OF CHICAGO

Departments of Computer Science, Mathematics, Statistics, and the Computation Institute
SCIENTIFIC AND STATISTICAL COMPUTING SEMINAR

JEAN BERNARD LASSERRE

Laboratory for Analysis and Architecture of Systems, CNRS

Reconstruction of Algebraic-Exponential Data from Moments

Joint work with M. Putinar

THURSDAY, May 15, 2014, at 4:30 PM

Eckhart 133, 5734 S. University Avenue

ABSTRACT

Let G be a bounded open subset of Euclidean space with real algebraic boundary Γ . In a first part of the talk we consider the case where $G = \{x : g(x) \leq 1\}$ for some quasi-homogeneous polynomial g and derive several properties of G as well as the non-Gaussian integral $\int \exp(-g)dx$. In particular we show that the volume of G is a convex function of the coefficients of g .

Next, we consider a more general case and under the assumption that the degree d of Γ is given, and the power moments of the Lebesgue measure on G are known up to order $3d$, we describe an algorithmic procedure for obtaining a polynomial vanishing on Γ . The particular case of semi-algebraic sets defined by a single polynomial inequality raises an intriguing question related to the finite determinateness of the full moment sequence. The more general case of a measure with density equal to the exponential of a polynomial is treated in parallel. Our approach relies on Stokes theorem and simple Hankel-type matrix identities.

Organizers:

Lek-Heng Lim, Department of Statistics, lekheng@galton.uchicago.edu,

Ridgway Scott, Departments of Computer Science and Mathematics, ridg@cs.uchicago.edu,

Jonathan Weare, Department of Statistics and The James Franck Institute, weare@uchicago.edu.

SSC Seminar URL: http://www.stat.uchicago.edu/seminars/SSC_seminars.shtml.

If you wish to subscribe to our email list, please visit the following website:

<https://lists.uchicago.edu/web/arc/statseminars>.