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The full infinite dimensional moment problem on symmetric algebras of locally convex real spaces

Abstract

This talk aims to introduce an infinite dimensional version of the classical full moment problem and explore certain instances which actually arise in several applied fields. The general theoretical question addressed is whether a linear functional L on the symmetric algebra $S(V)$ of a locally convex topological real vector space V can be represented as an integral w.r.t. a non-negative Radon measure supported on a fixed subset of the algebraic dual V^* of V . I present a recent joint work with M. Ghasemi, S. Kuhlmann and M. Marshall where we get representations of continuous positive semidefinite linear functionals $L : S(V) \rightarrow \mathbb{R}$ as integrals w.r.t. uniquely determined Radon measures supported in special sorts of closed balls in the topological dual space V' of V . A better characterization of the support is obtained when L is positive on a $2d$ -power module of $S(V)$. I compare these results with the corresponding ones for the full moment problem on locally convex nuclear spaces, pointing out the crucial roles played by the continuity and the quasi-analyticity assumptions on L in determining the support of the representing measure. In particular, I focus on a joint work with T. Kuna and A. Rota where we derive an analogous result for functionals on the symmetric algebra of the space of test functions on \mathbb{R}^d which are positive on quadratic modules but not necessarily continuous. This setting is indeed general enough to encompass many spaces which occur in concrete applications, e.g. the space of point configurations.

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Talk location: Cupples I Room 113

Special Session: Finite and infinite dimensional moment problems. Organized by M. Infusino, S. Kuhlmann, and T. Kuna.