Abstract

This talk aims to introduce an infinite dimensional version of the classical moment problem, namely the full moment problem on a locally convex topological space, and explore certain instances of this problem which actually arise in several applied fields. Given a locally convex topology $\tau$ on a real vector space $V$ and a linear functional $L$ on the symmetric algebra $S(V)$, the question addressed is whether $L$ can be represented as an integral w.r.t. a non-negative Radon measure supported on the algebraic dual $V^*$ of $V$. In particular, I present a recent joint work with M. Ghasemi, S. Kuhlmann and M. Marshall where we explain how a locally convex topology $\tau$ on $V$ naturally extends to a locally multiplicatively convex topology $\bar{\tau}$ on $S(V)$. This allows us to apply some recent results on locally multiplicatively convex topological algebras to obtain representations of $\bar{\tau}$-continuous positive semidefinite linear functionals $L : S(V) \to \mathbb{R}$ as integrals w.r.t. uniquely determined Radon measures supported on special sorts of closed balls in the topological dual space $V'$ of $V$. I intend to compare our theorem with the corresponding results for the moment problem on locally convex nuclear spaces, pointing out the crucial roles played by the continuity and the quasi-analyticity assumptions.