Moment Problem: Proof of Haviland's Theorem

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Abstract

One of the milestones in the moment theory is the Haviland Theorem (1936), which establishes a fascinating connection between real algebraic geometry and functional analysis. In fact, via this theorem, sequences of moments of non-negative Borel measures correspond to positive linear functionals on $\mathbb{R}[x_1, \ldots, x_d]$. In this seminar we will derive Haviland's theorem as a special case of a more general result for positive linear functionals on $\mathbb{R}$-algebras, whose proof is based on Riesz' representation theorem.