# Projective limit techniques for Positivstellensätze

(Joint work with Maria Infusino, Tobias Kuna and Patrick Michalski)

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**Résumé:** In this talk we discuss Positivstellensätze in the general context of a unital, commutative, not necessarily finitely generated, real algebra. We focus on the dual problem, and give an introduction to (real) infinite dimensional moment problems (i.e. when measures are supported on real infinite dimensional spaces). We will focus on the following problem: when can a linear functional on a unital commutative real algebra A be represented as an integral w.r.t. a Radon measure on the real character space X(A) equipped with the Borel σ-algebra generated by the weak topology? Our main idea is to construct X(A) as a projective limit of the charact! er spaces of all finitely generated subalgebras of A, to be able to exploit the classical finite dimensional moment theory in the infinite dimensional case. We thus obtain existence results for representing measures defined on the cylinder σ-algebra on X(A), carried by the projective limit construction. If in addition the well-known Prokhorov (ε-K) condition is fulfilled, then we can solve our problem by extending such representing measures from the cylinder to the Borel σ-algebra on X(A). These results allow us to establish e.g. infinite dimensional analogues of the classical Riesz-Haviland.

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