

Moment problems for real measures on the unit circle

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In this talk we are considering the following problem: when are the given complex numbers $(c_j)_{j=-n}^n$, $c_{-j} = \bar{c}_j$, the first moments of a real Borel measure $\mu = \mu^+ - \mu^-$ on \mathbb{T} , such that μ^- is supported on a set of at most k points. A necessary and sufficient condition is that the Toeplitz matrix $T = (c_{i-j})_{i,j=0}^n$ is a certain real linear combination of rank 1 Toeplitz matrices. For $k > 0$, this is more general than the condition that T admits Hermitian Toeplitz extensions with k negative squares. For a singular T , an equivalent condition is that a certain polynomial has all its roots on \mathbb{T} . We also discuss the situation when T is invertible.

This talk is based on joint work with Ekaterina Lopushanskaya.