CAUCHY–STIELTJES FAMILIES WITH POLYNOMIAL VARIANCE FUNCTIONS AND GENERALIZED ORTHOGONALITY

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Abstract: This paper studies variance functions of Cauchy–Stieltjes Kernel (CSK) families generated by compactly supported centered probability measures. We describe several operations that allow us to construct additional variance functions from known ones. We construct a class of examples which exhausts all cubic variance functions, and provide examples of polynomial variance functions of arbitrary degree. We also relate CSK families with polynomial variance functions to generalized orthogonality.

Our main results are stated solely in terms of classical probability; some proofs rely on analytic machinery of free probability.

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