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Spectral asymptotics for Kac–Murdock–Szegő matrices

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Abstract. Szegő's First Limit Theorem provides the limiting statistical distribution of the eigenvalues of large Toeplitz matrices. Szegő's Second (or Strong) Limit Theorem for Toeplitz matrices gives a second order correction to the First Limit Theorem, and allows one to calculate asymptotics for the determinants of large Toeplitz matrices. In this paper we survey results extending the First and Second Limit Theorems to Kac–Murdock–Szegő (KMS) matrices. These are matrices whose entries along the diagonals are not necessarily constants, but modeled by functions. We clarify and extend some existing results, and explain some apparently contradictory results in the literature.

Keywords and phrases: Toeplitz matrices, Kac–Murdock–Szegő matrices, Szegő's Limit Theorem, Schrödinger operators, determinants

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