PROBABILISTIC LIMIT THEOREMS FROM THE ZEROS OF POLYNOMIALS

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We study sequences of discrete random variables whose probability generating functions are zero-free in a sector of the complex plane around the positive real axis. Bounds on the cumulants of all orders are stated which give rise to a variety of probabilistic limit theorems like Berry–Esseen bounds, moderate deviations or mod-Gaussian convergence. We also consider a number of examples with a combinatorial or geometric flavour.