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UNIVERSALITY IN THE LAGUERRE–PÓLYA CLASS

The Laguerre-Pólya class, denoted by $\mathcal{LP}$, consists of entire functions which are limits, in the sense of local uniform convergence, of polynomials with only real zeros. Interesting and important functions from $\mathcal{LP}$ are those represented as Fourier transforms of certain positive Borel measures. The problem to characterize the latter subclass was posed by George Pólya in 1926 who was motivated by his efforts to settle the Riemann hypothesis. Essentially the same question arose in Statistical Mechanics and it is related to the celebrated Lee-Yang circle theorem, for which Lee and Yang were awarded the 1957 Nobel Prize in physics. We report a result which provides a characterization of the so-called Lee-Yang measures and a solution of Pólya's problem too, in terms of the polynomials, orthogonal with respect to the measure.

We shall discuss also another conjecture of Pólya which states that the real line attracts the zeros of the entire functions of order less than two under differentiation. Though the conjecture was settled by Craven, Csordas and Smith, further results indicate that once such a function is differentiated, the zeros not only approach the real line but also become equally spaced.