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NEW BOUNDS FOR THE EXTREME ZEROS OF LAGUERRE POLYNOMIALS

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Abstract

The properties and location of the zeros of orthogonal polynomials have attracted the efforts of many researchers since the late 19th century. There are a lot of applications for the zeros of orthogonal polynomials and this determines the significance of the subject.

By applying well-known techniques such as Euler-Rayleigh method (assisted by computer algebra) and Gershgorin circle theorem, we obtain new bounds for the largest and the smallest zero of the n-th degree Laguerre polynomial $L_n^{(\alpha)}$, $\alpha > -1$. It turns out that our estimates are competitive to some of the known best bounds.

Keywords: Laguerre polynomials, bounds for zeros of orthogonal polynomials, Euler-Rayleigh method, Gershgorin circle theorem, recurrence relations.

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