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Asymptotic zero distribution of a class of hypergeometric polynomials

K. A. Driver, S. J. Johnston

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We prove that the zeros of ${}_2F_1(-n,\frac{n+1}{2};\frac{n+3}{2};z)$ asymptotically approach the section of the lemniscate $\{z: |z(1-z)^2|=4/27; \textrm{Re}(z)>1/3\}$ as $n\rightarrow \infty$. In recent papers (cf. \cite{KMF}, \cite{orive}), Mart\'inez-Finkelshtein and Kuijlaars and their co-authors have used Riemann-Hilbert methods to derive the asymptotic zero distribution of Jacobi polynomials $P_n^{(\alpha_n,\beta_n)}$ when the limits $\ds A=\lim_{n\rightarrow \infty}\frac{\alpha_n}{n}$ and $\ds B=\lim_{n\rightarrow \infty}\frac{\beta_n}{n}$ exist and lie in the interior of certain specified regions in the AB-plane. Our result corresponds to one of the transitional or boundary cases for Jacobi polynomials in the Kuijlaars Mart\'inez-Finkelshtein classification.

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