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Radii of starlikeness and convexity of some entire functions. (English) [Zbl 1451.30011]

Summary: A normalized analytic function \( f \) is lemniscate starlike if the quantity \( z f'(z)/f(z) \) lies in the region bounded by the right half of the lemniscate of Bernoulli \( |w^2 - 1| = 1 \). It is Janowski starlike if the quantity \( z f'(z)/f(z) \) lies in the disk whose diametric end points are \((1 - A)/(1 - B)\) and \((1 + A)/(1 + B)\) for \(-1 \leq B < A \leq 1\). The radii of lemniscate starlikeness and Janowski starlikeness have been determined for normalizations of \( q \)-Bessel functions, Bessel functions of first kind of order \( \nu \) and Lommel functions of first kind. Corresponding convexity radii are also determined.

MSC:
30C10 Polynomials and rational functions of one complex variable
30C15 Zeros of polynomials, rational functions, and other analytic functions of one complex variable (e.g., zeros of functions with bounded Dirichlet integral)
30C45 Special classes of univalent and multivalent functions of one complex variable (starlike, convex, bounded rotation, etc.)

Keywords:
\( q \)-Bessel function; Lommel function; lemniscate starlikeness; Janowski starlikeness; radius problem

Full Text: DOI

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