ON THE EXACT MARKOV INEQUALITY FOR k-MONOTONE POLYNOMIALS IN UNIFORM AND L_1-NORMS

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Abstract

We consider the classical extremal problem of estimating norms of higher order derivatives of algebraic polynomials when their norms are given. The corresponding extremal problem for general polynomials in uniform norm was solved by A. A. Markov, while Bernstein found the exact constant in the Markov inequality for *monotone* polynomials. In this note we give Markov-type inequalities for higher order derivatives in the general class of k-*monotone* polynomials. In particular, in case of first derivative we find the exact solution of this extremal problem in both uniform and L_1-norms. This exact solution is given in terms of the largest zeros of certain Jacobi polynomials.

Keywords: Markov inequality, k-convex polynomial, Jacobi polynomial, Bessel function

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