Dette, Holger
A note on some peculiar nonlinear extremal phenomena of the Chebyshev polynomials.
(English) Zbl 0820.33004

We consider the problem of maximizing the sum of squares of the leading coefficients of polynomials $P_1(x), \ldots, P_m(x)$ (where $P_j(x)$ is a polynomial of degree $j$) under the restriction that the sup-norms of $\sum_{j=1}^m P_j^2(x)$ is bounded on the interval $[-b, b]$ ($b > 0$). A complete solution of the problem is presented using duality theory of convex analysis and the theory of canonical moments. It turns out, that contrary to many other extremal problems the structure of the solution will depend heavily on the size of the interval $[-b, b]$.

Reviewer: H. Dette (Dresden)

MSC:
33C45 Orthogonal polynomials and functions of hypergeometric type (Jacobi, Laguerre, Hermite, Askey scheme, etc.)

Keywords:
Chebyshev polynomials; convex analysis; canonical moments

Full Text: DOI arXiv

References:

This reference list is based on information provided by the publisher or from digital mathematics libraries. Its items are heuristically matched to zbMATH identifiers and may contain data conversion errors. It attempts to reflect the references listed in the original paper as accurately as possible without claiming the completeness or perfect precision of the matching.