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On complex (non-analytic) Chebyshev polynomials in \( \mathbb{C}^2 \). (English) Zbl 1254.32008


Summary: We consider the problem of finding a best uniform approximation to the standard monomial on the unit ball in \( \mathbb{C}^2 \) by polynomials of lower degree with complex coefficients. We reduce the problem to a one-dimensional weighted minimization problem on an interval. In a sense, the corresponding extremal polynomials are uniform counterparts of the classical orthogonal Jacobi polynomials. They can be represented by means of special conformal mappings on the so-called comb-like domains. In these terms, the value of the minimal deviation and the representation for a polynomial of best approximation for the original problem are given. Furthermore, we derive asymptotics for the minimal deviation.

MSC:

32A30 Other generalizations of function theory of one complex variable
30E10 Approximation in the complex plane
41A10 Approximation by polynomials
41A63 Multidimensional problems
30C20 Conformal mappings of special domains

Keywords:
polynomial approximation on the ball in \( \mathbb{C}^2 \); special conformal mapping, comb-like domains

Software:
SC Toolbox; Schwarz-Christoffel

Full Text: DOI Link

References:


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