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BOUNDED APPROXIMATION BY POLYNOMIALS WITH RESTRICTED ZEROS[1]

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1. Introduction. Let C be a rectifiable Jordan curve, D its interior. A sequence of polynomials $P_n(z)$ is said to converge boundedly to a function $f(z)$ in D, or equivalently, $f(z)$ is said to be boundedly approximated by the polynomials $P_n(z)$ in D, if $\sup\{|P_n(z)| : z\in D\}$ is bounded as a function of n, and $\{P_n(z)\}$ converges to $f(z)$ throughout D. It is known [1], [6] that $f(z)$ can be boundedly approximated by polynomials in D if and only if $f(z)$ is a bounded holomorphic function in D. In this paper we consider the more delicate bounded approximation problem in which the zeros of the polynomials are required to lie on the boundary C. Polynomials whose zeros lie on C are called C-polynomials.

A different kind of appproximation by C-polynomials was studied by G. R. MacLane [5]. He proved that if $f(z)$ is holomorphic and zero free in D, then there exists a sequence of C-polynomials which converges to $f(z)$ uniformly on every compact subset of D. This result was later extended by J. Korevaar [3] and his students [4] to more general sets D.

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