Ehrich, S.

Gauss-Kronrod quadrature error estimates for analytic functions. (English) Zbl 0806.41018

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Error bounds are proved for the Gauss-Kronrod quadrature formula and analytic functions, using the maximum modulus of the integrand along closed contours in the complex plane, and in particular along circles and ellipses.

Furthermore, the remainder functional is investigated for the first ν (for increasing polynomial degree) Chebyshev polynomials of the first and second kind which are not integrated exactly. It is shown, for sufficiently large n and independent ν, that these values are negative, and that their absolute values increase with the polynomial degree.

Reviewer: S.Ehrich (Hildesheim)

MSC:

41A55	Approximate quadratures
41A80	Remainders in approximation formulas
30E20	Integration, integrals of Cauchy type, integral representations of analytic functions in the complex plane
33C45	Orthogonal polynomials and functions of hypergeometric type (Jacobi, Laguerre, Hermite, Askey scheme, etc.)
65D32	Numerical quadrature and cubature formulas

Keywords:

error bounds; Gauss-Kronrod quadrature; Chebyshev polynomials