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Maximum of the modulus of kernels of Gaussian quadrature formulae for one class of Bernstein-Szegö weight functions. (English) Zbl 1257.41020

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The authors investigate the kernels in the reminder terms $R_n(f)$ of a Gaussian weighted quadrature formula for analytic functions f inside some elliptic contours. The weight function of Bernstein-Szegő type considered is

$$w_\gamma^{(-1/2)}(t) = (1-t^2)^{-1/2} = (1-t^2)^{-1/2} \cdot \left(1 - \frac{4\gamma}{(1+\gamma)^2} t^2\right)^{-1},$$

with $t \in (-1,1)$ and $\gamma \in (-1,0)$. They give sufficient conditions that ensure that the modulus of the kernel reaches the maximum at the point of intersection of the elliptical contour with either the real or imaginary axis. Thus, they deduce the error bounds of the corresponding Gauss quadratures. Numerical tests are performed to prove the quality of the derived bounds, compared to other error bounds intended for the same class of integrands.

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