Anti-Gaussian quadrature formulae of Chebyshev type

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Laurie (cf. [3]), in 1996, in an attempt to estimate practically the error of the Gauss quadrature formula, developed the anti-Gaussian quadrature formula, which is an $(n + 1)$-point interpolatory formula designed to have an error precisely opposite to the error of the Gauss formula for all polynomials of degree up to $2n + 1$. The anti-Gaussian formula enjoys nice properties: Its nodes interlace with the Gauss nodes and, with the possible exception of the first and the last one, they are contained in the support interval; its weights are all positive; and the formula has precise degree of exactness $2n - 1$ and it can easily be constructed.

A Chebyshev type quadrature formula is an n-point interpolatory formula having equal weights, real nodes and degree of exactness (at least) n (cf. [2]). Equally-weighted quadrature formulae are useful in practice, because they minimize both the number of computations involved and the effect of random errors in the function values (cf. [1], Chapter 9). Furthermore, the study of Chebyshev type formulae is an intriguing mathematical problem.

In this talk, we examine whether there are positive measures admitting anti-Gaussian formulae of Chebyshev type.

References

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