A SPECIAL GAUSSIAN RULE FOR TRIGONOMETRIC POLYNOMIALS

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This paper is dedicated to Professor Themistocles M. Rassias.

ABSTRACT. Abram Haimovich Turetzkii [*Uchenye Zapiski*, **1** (149) (1959), 31–55 (translation in English in *East J. Approx.* **11** (2005), 337–359)] considered interpolatory quadrature rules which have the following form $\int_0^{2\pi} f(x)w(x)dx \approx \sum_{\nu=0}^{2n} w_\nu f(x_\nu)$, and which are exact for all trigonometric polynomials of degree less than or equal to n. Maximal trigonometric degree of exactness of such quadratures is $2n$, and such kind of quadratures are known as *quadratures of Gaussian type* or *Gaussian quadratures for trigonometric polynomials*. In this paper we prove some interesting properties of a special Gaussian quadrature with respect to the weight function $w_m(x) = 1 + \sin mx$, where m is a positive integer.

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