Generalized averaged Gaussian quadrature rule for trigonometric polynomials

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Abstract

This paper addresses the construction of generalized averaged Gaussian quadrature formulas on the space of trigonometric polynomials. The construction and motivation of these formulas are based on the generalized averaged Gaussian quadrature rules introduced by Spalević [Math. Comput. 76.259 (2007) 1483–1492]. The main idea relies on the connection between the nodes and weights of these quadrature formulas for trigonometric polynomials with the nodes and weights of the corresponding quadrature rules defined on the spaces of algebraic polynomials. Special attention is devoted to even weight functions, which allows certain simplifications in the construction of the quadrature rules in this setting. Numerical examples are provided to illustrate the performance of the proposed method.

Keywords: Orthogonal trigonometric polynomials, Quadrature formulas, Even weight function, General averaged Gaussian quadrature rule