

Recurrence Relations for Multiple Orthogonal Trigonometric Polynomials of Semi-Integer Degree and its Applications

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Abstract

In this paper, we show that the construction of multiple orthogonal trigonometric polynomials of semi-integer degree can be based solely on recurrence relations involving nearest-neighbor multi-indices. These polynomials are important for constructing optimal sets of quadrature rules with an odd number of nodes for trigonometric polynomials, in the sense of Borges [Numer. Math. 67 (1994) 271–288]. Also, we introduce the set of anti-Gaussian quadrature rules for the optimal set of quadrature rules with an odd number of nodes for trigonometric polynomials, in the sense of Borges. We construct such quadrature rules using multiple orthogonal trigonometric polynomials of semi-integer degree, and present some illustrative numerical examples.

Keywords: Trigonometric Polynomials of Semi-Integer Degree, Multiple orthogonality, Weight function, Optimal sets of quadrature rules in the sense of Borges