Optimal set of quadrature rules for trigonometric polynomials with preassigned nodes

Tatjana V. Tomović Mladenović[1], Marija P. Stanić[1], and Aleksandar Ne. Jovanović[2]

[1]University of Kragujevac, Faculty of Science, Department of Mathematics and Informatics,
tatjana.tomovic@pmf.kg.ac.rs, marija.stanic@pmf.kg.ac.rs
[2]University of Kragujevac, Faculty of Mechanical and Civil Engineering,
aleksandar.jovanovic@pmf.kg.ac.rs

In the case when we have numerically evaluating of a set of definite integrals taken with respect to distinct weight functions, but related to a common integrand and interval of integration it is not efficient to use a set of Gauss–Christoffel quadrature rules, because valuable information is wasted. Borges has introduced the optimal set of quadrature rules for algebraic polynomials [1].

Quadrature rules of Gaussian type for trigonometric polynomials are generalization of the classical Gaussian quadrature rules for algebraic polynomials. We introduced multiple orthogonal trigonometric polynomials of semi-integer degree and the corresponding the optimal set of quadrature rules for trigonometric polynomials [2, 3]. Also, we investigated such quadrature rules with preassigned nodes.

References

[1] C. F. Borges, On a class of Gauss-like quadrature rules, Numer. Math. **67** (1994), 271–288.

[2] G. V. Milovanović, M. P. Stanić, T. V. Tomović, Trigonometric multiple orthogonal polynomials of semi-integer degree and the corresponding quadrature formulas, Publ. Inst. Math. (Beograd) (N.S.) **96**(110) (2014), 211–226.

[3] M. P. Stanić, T. V. Tomović, Multiple orthogonality in the space of trigonometric polynomials of semi-integer degree, FILOMAT **29**(10) (2015), 2227–2237.