σ-ORTHOGONAL POLYNOMIALS ON THE SEMICIRCLE

M. P. Stanić, T .V. Tomović Mladenović, **A. S. Milosavljević**
Department of Mathematics and Informatics, Faculty of Science, University of Kragujevac
Radoja Domanovića 12, 34000 Kragujevac, Serbia
aleksandra.milosavljevic@pmf.kg.ac.rs

Orthogonal polynomials on the semicircle and the corresponding quadratures of Gaussian type were introduced and studied by Gautschi and Milovanović for the first time in [1]. In the real case quadrature rules with multiple nodes [3] are observed. A special case of polynomials whose zeros are these multiple nodes are given by the so-called s-orthogonality conditions, and the general case involves σ-orthogonality conditions [2]. The s-orthogonal polynomials on the semicircle are considered in [4]. We introduce σ-orthogonal polynomials on the semicircle and give a detailed study in three special cases where the weight function is the Chebyshev weight function of the first kind.

References

[1] W. Gautschi, G. V. Milovanović, *Polynomials orthogonal on the semicircle*, J. Approx. Theory 46 (1986), pp. 230–250.

[2] W. Gautschi, G. V. Milovanović, *S-orthogonality and construction of Gauss-Turán-type quadrature formulae*, J. Comput. Appl. Math. 86, pp. (1997), 205–218.

[3] G. V. Milovanović, M. P. Stanić, *Quadrature rules with multiple nodes*, In: Mathematical Analysis, Approximation Theory and Their Application, Series: Springer Optimization and its Applications, Vol. 111 (Th. Rassias, V. Gupta, eds.), pp. 435–462, Springer, 2016, ISBN 978-3-319-31279-8.

[4] M. Stanić, *S-orthogonality on the semicircle*, Kragujevac J. Math. 26 (2004), pp. 39–48.