Multiple orthogonal polynomials and generalized quadrature formulae

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There are several applications of multiple orthogonal polynomial, which are also known as Hermite-Padé polynomials (cf. Aptekarev [1]). Some interesting properties of these polynomials were investigated by Van Assche [2] and Van Assche and Coussement [3].

An application of multiple orthogonal polynomials to Borges quadratures (1994) was given by Milovanović and Stanić (2003).

In this lecture we consider a class of generalized quadrature formulae of Birkhoff-Young type for analytic functions in the complex plane and give a direct connection with multiple orthogonal polynomials. Precisely, we give a characterization of such generalized quadratures in terms of multiple orthogonal polynomials and prove the existence and uniqueness of these quadratures. Finally, a method for constructing such kind of quadratures and some numerical examples are given.

References

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[3] W. Van Assche, E. Coussement, *Some classical multiple orthogonal polynomials*, J. Comput. Appl. Math. 127 (2001), pp. 317–347.