

Asymptotics of orthogonal polynomials for the Abel weight

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Abstract

Orthogonal polynomials $P_n(x)$ with respect to the Abel weight function $w_A(x) = \frac{x}{2 \sinh(\pi x)}$ are used for numerical summation of alternating series by means of the Abel-Plana formula. Also, they are known to be related to Bernoulli and Euler numbers. In this paper we first give an integral representation for these polynomials. Then, using this representation, we investigate the asymptotic behavior of $P_n(x)$ when n is large.

Keywords: Orthogonal polynomials, Abel weight function, Asymptotic expansion

References

1. Djukić, D.Lj.: Asymptotics of orthogonal polynomials for the Abel weight, *J. Math. Anal. Appl.* Vol.555(2) (2025) <https://doi.org/10.1016/j.jmaa.2025.130064>