

SOME TWO-SIDED BOUNDING INEQUALITIES FOR THE BUTZER–FLOCKE–HAUSS OMEGA FUNCTION

TIBOR K. POGÁNY AND H. M. SRIVASTAVA

Abstract. A new integral representation is obtained for the Butzer-Flocke-Hauss complete real-argument Omega function $\Omega(x)$, which is closely associated with the complex-index Bernoulli function $B_\alpha(z)$ and with the complex-index Euler function $E_\alpha(z)$. Three two-sided bounding inequalities are given for this Omega function and their efficiency is also discussed.

Mathematics subject classification (2000): 33E20, 33E30, 34A30, 34A40.

Key words and phrases: Butzer-Flocke-Hauss complete omega function, Chaplygin type differential inequality, Chaplygin type comparison theorem, Dirichlet series, integral representation of the Omega function, Laplace integral representation of Dirichlet series.

REFERENCES

- [1] M. BERTOLINO, *Numerical Analysis*, Naučna knjiga, Beograd, 1977 (in Serbo-Croatian).
- [2] P. L. BUTZER, *Bernoulli functions, Hilbert-type Poisson summation formulae, partial fraction expansions, and Hilbert-Eisenstein series*, in *Analysis, Combinatorics and Computing*, (T.-X. He, P. J.-S. Shiue and Z.-K. Li, Editors), Nova Science Publishers, Hauppauge, New York, 2002, 25–91.
- [3] P. L. BUTZER, M. HAUSS, *Applications of sampling theory to combinatorial analysis, Stirling numbers, special functions and the Riemann zeta function*, in *Sampling Theory in Fourier and Signal Analysis: Advanced Topics* (J. R. Higgins and R. L. Stens, Editors), Clarendon (Oxford University) Press, Oxford, 1999, 1–37 and 266–268.
- [4] P. L. BUTZER, S. FLOCKE AND M. HAUSS, *Euler functions $E_\alpha(z)$ with complex α and applications*, in *Approximation, Probability and Related Fields*, (G. A. Anastassiou and S. T. Rachev, Editors), Plenum Press, New York, 1994, 127–150.
- [5] P. L. BUTZER, T. K. POGÁNY AND H. M. SRIVASTAVA, *A linear ODE for the Omega function associated with the Euler function $E_\alpha(z)$ and the Bernoulli function $B_\alpha(z)$* , *Appl. Math. Lett.*, **19**, (10) (2006), 1073–1077.
- [6] D. S. MITRINOVIĆ, J. E. PEČARIĆ, *Differential and Integral Inequalities*, Matematički Problemi i Ekspozicije, **13**, Naučna knjiga, Beograd, (1988) (in Serbo-Croatian).
- [7] T. K. POGÁNY, H. M. SRIVASTAVA AND Ž. TOMOVSKI, *Some families of Mathieu \mathbf{a} -series and alternating Mathieu \mathbf{a} -series*, *Appl. Math. Comput.*, **173**, (1) (2006), 69–108.
- [8] H. M. SRIVASTAVA, Ž. TOMOVSKI, *Some problems and solutions involving Mathieu's series and its generalization*, *J. Inequal. Pure Appl. Math.*, **5**, (2) (2004), Article 45, 1–13 (electronic).