

CAUCHY'S ERROR REPRESENTATION OF LIDSTONE INTERPOLATING POLYNOMIAL AND RELATED RESULTS

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Abstract. In this paper we consider the Cauchy's error representation of Lidstone interpolating polynomial and as a consequence the results concerning to the Hermite-Hadamard inequalities. Using these inequalities, we produce new exponentially convex functions. Also, we give several examples of the families of functions for which the obtained results can be applied.

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REFERENCES

- [1] R. P. AGARWAL, P. J. Y. WONG, *Error Inequalities in Polynomial Interpolation and Their Applications*, Kluwer Academic Publishers, Dordrecht/Boston/London, 1993.
- [2] K. E. ATKINSON, *An Introduction to Numerical Analysis*, 2nd ed., Wiley, New York, 1989.
- [3] W. EHM, M. G. GENTON, T. GNEITING, *Stationary covariance associated with exponentially convex functions*, *Bernoulli* **9** (4) (2003), 607–615.
- [4] J. JAKŠETIĆ, J. PEČARIĆ, *Exponential Convexity Method*, *J. Convex Anal.* **20** (1) (2013), 181–197.
- [5] S. KARLIN, *Total Positivity*, Stanford Univ. Press, Stanford, 1968.
- [6] S. KARLIN, W. J. STUDDEN, *Tchebycheff systems: with applications in analysis and statistics*, Interscience, New York, 1966.
- [7] J. PEČARIĆ, J. PERIĆ, *Improvements of the Giaccardi and the Petrović inequality and related results*, *An. Univ. Craiova Ser. Mat. Inform.*, **39** (1) (2012), 65–75.
- [8] J. E. PEČARIĆ, F. PROSCHAN AND Y. L. TONG, *Convex functions, partial orderings, and statistical applications*, *Mathematics in science and engineering* 187, Academic Press, 1992.
- [9] T. POPOVICIU, *Sur l'approximation des fonctions convexes d'ordre superieur*, *Mathematica* **10**, (1934), 49–54.
- [10] J. M. WHITTAKER, *On Lidstone series and two-point expansions of analytic functions*, *Proc. Lond. Math. Soc.*, **36**, (1933–1934) 451–469.
- [11] D. V. WIDDER, *Completely convex function and Lidstone series*, *Trans. Am. math. soc.*, **51** (1942), 387–398.
- [12] D. V. WIDDER, *The Laplace transform*, Princeton Univ. Press, New Jersey, 1941.