

WEIGHTED INTEGRAL INEQUALITY FOR THE SECOND DERIVATIVE OF 4-CONVEX FUNCTIONS

JOSIP PEČARIĆ, MUHAMMAD SHOAIB SALEEM,
IRSHAAD AHMED AND NAVEED AHMED

Abstract. In this paper, we establish an energy estimate for the second derivative of 4-convex functions. Such kinds of estimates for the first derivative of 2-convex (convex) functions were obtained by Hussain, Pečarić and Shashivili [5].

Mathematics subject classification (2010): 46B70.

Keywords and phrases: 4-convex functions, mollification, energy estimate.

REFERENCES

- [1] Z. BOROS AND N. NAGY, *Generalized Rolewicz theorem for convexity of higher order*, Math. Inequal. Appl. **18**, 4 (2015), 1275–1281.
- [2] G. CRISTESCU, M. A. NOOR AND M. U. AWAN, *Some inequalities for functions having an s -convex derivative of superior order*, Math. Inequal. Appl. **19**, 3 (2016), 893–907.
- [3] S. S. DRAGOMIR, *Symmetrized convexity and Hermite-Hadamard type inequalities*, J. Math. Inequal. **10**, 4 (2016), 901–918.
- [4] L. C. EVANS, *Partial Differential Equations*, Graduate Studies in Mathematics **19**, American Mathematical Society, Providence, RI, 1998.
- [5] S. HUSSAIN, J. PEČARIĆ, AND M. SHASHIAHVILI, *The weighted square integral inequalities for the first derivative of the function of a real variable*, J. Inequal. Appl. **2008**, Art. ID 343024, 14 pp.
- [6] S. HUSSAIN AND M. SHASHIAHVILI, *Discrete time hedging of the American option*, Mathematical Finance, **20** (2010), 647–670.
- [7] A. R. KHAN, J. PEČARIĆ AND S. VAROŠANEC, *Positivity of sums and integrals for convex functions of higher order of n variables*, Math. Inequal. Appl. **19**, 1 (2016), 221–247.
- [8] A. OLBRYŚ, *On some inequalities equivalent to the Wright-convexity*, J. Math. Inequal. **9**, 2 (2015), 449–461.
- [9] J. PEČARIĆ AND K. SMOLJAK, *Steffensen type inequalities involving convex functions*, Math. Inequal. Appl. **18**, 1 (2015), 363–378.
- [10] J. PEČARIĆ AND M. PRALJAK, *Hermite interpolation and inequalities involving weighted averages of n -convex functions*, Math. Inequal. Appl. **19**, 4 (2016), 1169–1180.
- [11] J. PEČARIĆ, D. POKAZ AND M. PRALJAK, *Boas-type inequality for 3-convex functions at a point*, Math. Inequal. Appl. **19**, 4 (2016), 1363–1374.
- [12] T. RAJBA, *On strong delta-convexity and Hermite-Hadamard type inequalities for delta-convex functions of higher order*, Math. Inequal. Appl. **18**, 1 (2015), 267–293.
- [13] K. SHASHIAHVILI AND M. SHASHIAHVILI, *Estimation of the derivative of the convex function by means of its uniform approximation*, J. Inequal. Pure and Appl. Math., vol. **6**, no. 4, article 113, pp. 1–10, 2005.
- [14] J. E. PEČARIĆ, F. PROSCHAN AND Y. L. TONG, *Convex functions, Partial Orderings and Statistical Applications*, Academic Press, New York, 1992.
- [15] A. W. ROBERTS AND D. E. VARBERG, *Convex Functions*, Academic Press, New York, 1973.