

CONVEX ORDERING PROPERTIES AND APPLICATIONS

AURELIA FLOREA, EUGEN PĂLTĂNEA AND DUMITRU BĂLĂ

Abstract. A relevant application of the stochastic convex order is the well-known weighted Hermite-Hadamard inequality, where the weight is provided by a given probability distribution. Our goal is to show that, starting from such a fixed weight, we can fill the whole space between the Hermite-Hadamard bounds by highlighting some parametric families of probability distributions. Thus, we propose two alternative constructions based on the convex ordering properties.

Mathematics subject classification (2010): 26A51, 26B25, 26D10.

Keywords and phrases: Convex functions, Hermite-Hadamard inequality, convex order.

REFERENCES

- [1] M. K. BAKULA, J. PEČARIĆ AND J. PERIĆ, *Extensions of the Hermite-Hadamard inequality with applications*, *Math. Inequal. Appl.* **4** (2012), 899–921.
- [2] J. L. BRENNER, H. ALZER, *Integral inequalities for concave functions with applications to special functions*, *Proc. Roy. Soc. Edinburgh Sect. A* **118** (1991), 173–192.
- [3] J. DE LA CAL AND J. CÁRCAMO, *Multidimensional Hermite-Hadamard inequalities and the convex order*, *J. Math. Anal. Appl.* **324** (2006), 248–261.
- [4] L. FEJÉR, *Über die Fourierreihen, II*, *Naturwiss. Anz. Ungar. Akad. Wiss.* **24** (1906), 369–390.
- [5] A. M. FINK, *A best possible Hadamard Inequality*, *Math. Inequal. Appl.* **1** (1998), 223–230.
- [6] A. FLOREA AND C. P. NICULESCU, *A Hermite-Hadamard inequality for convex-concave symmetric functions*, *Bull. Soc. Sci. Math. Roum.* **50** (2007), 149–156.
- [7] V. I. LEVIN AND S. B. STEČKIN, *Inequalities*, *Amer. Math. Soc. Transl.* **14** (1960), 1–29.
- [8] C. P. NICULESCU AND L.-E. PERSSON, *Convex Functions and their Applications: A Contemporary Approach* (CMS Books in Mathematics), Springer-Verlag New York Inc., New York, 2006.
- [9] J. OHLIN, *On a class of measures of dispersion with application to optimal reinsurance*, *ASTIN Bulletin* **5** (1969), 249–266.
- [10] A. OLBRYŚ AND T. SZOSTOK, *Inequalities of the Hermite-Hadamard type involving numerical differentiation formulas*, arXiv preprint, arXiv: 1411.7859v1 [math.CA] (2014).
- [11] T. RAJBA, *On probabilistic characterizations of convexity and delta-convexity*, *Conference on Inequalities and Applications* **14**, September 7–13, 2014, Hajdúszoboszló (Hungary).
- [12] T. RAJBA, *On the Ohlin lemma for Hermite-Hadamard-Fejér type inequalities*, *Math. Inequal. Appl.* **17** (2014), 557–571.
- [13] T. RAJBA, *On strong delta-convexity and Hermite-Hadamard type inequalities for delta-convex functions of higher order*, *Math. Inequal. Appl.* **18** (2015), 267–293.
- [14] M. SHAKED AND J. G. SHANTHIKUMAR, *Stochastic Orders*, Springer Series in Statistics, New York, 2007.
- [15] T. SZOSTOK, *Levin Stečkin theorem and inequalities of the Hermite-Hadamard type*, arXiv preprint, arXiv:1411.7708v1 [math.CA] (2014).
- [16] T. SZOSTOK, *Ohlin's lemma and some inequalities of the Hermite-Hadamard type*, *Aequat. Math.* (2014), DOI 10.1007/s00010-014-0286-2.