

FURTHER IMPROVEMENT OF AN EXTENSION OF HÖLDER-TYPE INEQUALITY

JULIJE JAKŠETIĆ, JOSIP PEČARIĆ AND KSENija SMOLJAK KALAMIR

Abstract. In 1995 Pearce and Pečarić proved an extension of Hölder's inequality. In this paper we extend their result in a measure theoretic sense and further improve it using log-convexity of related linear functionals. Moreover, we study the action of related linear functionals on families of exponentially convex functions.

Mathematics subject classification (2010): 26D15, 26D20.

Keywords and phrases: Hölder's inequality, Steffensen's inequality, measure theory, exponential convexity, log-convexity.

REFERENCES

- [1] N. I. AKHIEZER, *The Classical Moment Problem and Some Related Questions in Analysis*, Oliver and Boyd, Edinburgh, 1965.
- [2] S. N. BERNSTEIN, *Sur les fonctions absolument monotones*, Acta Math. **52** (1929), 1–66.
- [3] J. C. EVARD, H. GAUCHMAN, *Steffensen type inequalities over general measure spaces*, Analysis **17**, 2–3 (1997), 301–322.
- [4] H. GAUCHMAN, *A Steffensen type inequality*, J. Inequal. Pure Appl. Math. **1**, 1 (2000), Article 3.
- [5] H. GAUCHMAN, *On further generalization of Steffensen's inequality*, J. Inequal. Appl. **5**, 5 (2000), 505–513.
- [6] J. JAKŠETIĆ, J. PEČARIĆ, *Exponential convexity method*, J. Convex Anal. **20**, 1 (2013), 181–197.
- [7] J. JAKŠETIĆ, J. PEČARIĆ, *Steffensen's inequality for positive measures*, Math. Inequal. Appl. **18**, 3 (2015), 1159–1170.
- [8] J. JAKŠETIĆ, J. PEČARIĆ, K. SMOLJAK KALAMIR, *Some measure theoretic aspects of Steffensen's and reversed Steffensen's inequality*, J. Math. Inequal. **10**, 2 (2016), 459–469.
- [9] J. JAKŠETIĆ, J. PEČARIĆ, K. SMOLJAK KALAMIR, *Exponential convexity induced by Steffensen's inequality and positive measures*, Results Math. **73:136**, 4 (2018), 18 pages.
- [10] C. E. M. PEARCE, J. PEČARIĆ, *On an extension of Hölder's inequality*, Bull. Austral. Math. Soc. **51**, 3 (1995), 453–458.
- [11] 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.
- [12] J. E. PEČARIĆ, F. PROSCHAN, Y. L. TONG, *Convex functions, partial orderings, and statistical applications*, Mathematics in science and engineering **187**, Academic Press, 1992.
- [13] J. PEČARIĆ, K. SMOLJAK, *Improvement of an extension of Hölder-type inequality*, Anal. Math. **38**, 2 (2012), 135–146.
- [14] J. PEČARIĆ, K. SMOLJAK KALAMIR, S. VAROŠANEC, *Steffensen's and related inequalities (A comprehensive survey and recent advances)*, Monographs in inequalities 7, Element, Zagreb, 2014.