Journal of Mathematical Inequalities
Volume 14, Number 2 (2020), 559–575
doi:10.7153/jmi-2020-14-35

HERMITE–HADAMARD, FEJER AND SHERMAN TYPE INEQUALITIES FOR GENERALIZATIONS OF SUPERQUADRATIC AND CONVEX FUNCTIONS

SHOSHANA ABRAMOVICH

Abstract. In this paper we prove some Hermite-Hadamard, Fejer and Sherman type inequlities for generalizations of superquadratic functions and convex functions. These results, under a monotonicity condition, lead to refinements of the Hermite-Hadamard, Fejer and Sherman inequalities of non-negative convex functions. Also, the obtained inequalities are discussed about and compared with some recent generalizations of weighted Hermite-Hadamard inequalities.

Mathematics subject classification (2010): 26D15, 94A17.
Keywords and phrases: Convexity, superquadracity, N-quasisuperquadracity, N-quasiconvexity, Jensen type inequalities, Hermite-Hadamard type inequalities, Fejer type inequalities, Sherman type inequalities, f-divergence.

REFERENCES

[1] S. ABRAMOVICH, G. JAMESON, AND G. SINNAMON, *Refining Jensen's inequality*, Bull. Math. Soc. Sci. Math. Roumanie (N.S.) 47(95) (2004), no. 1-2, 3–14.
[2] S. ABRAMOVICH, L-E. PERSSON, *Fejer and Hermite-Hadamard Inequalities for N-quasiconvex functions*, Math. Notes, 102(5), (2017), 644–656.
[3] S. ABRAMOVICH, L-E. PERSSON, *Extensions and refinements of Fejer and Hermite-Hadamard Inequalities*, Math. Inequal. Applic, 21(3), (2018), 759–772.
[4] S. ABRAMOVICH, L-E. PERSSON, *Some new scales of refined Hardy type inequalities via functions related to superquadracity*, Math. Inequal. Appl., 16(3), (2013), 679–695.
[5] S. ABRAMOVICH, L-E. PERSSON, *Some new estimates of the 'Jensen gap'*, J. Inequal. Applic., (2016), 2016:39, 9 pages.
[6] S. BANIĆ, J. PEČARIĆ AND S. VAROŠANEC, *Superquadratic functions and refinements of some classical inequalities*, J. Korean Math. Soc., 45(2008), 513–525.
[7] G. H. HARDY, J. E. LITTLEWOOD AND G. PÓLYA, *Inequalities*, Cambridge University press, 1964.
[8] S. IVELIĆ BRADANOVIĆ, N. LATIF AND J. PEČARIĆ, *On an upper bound for Sherman's inequality*, J. Inequal. Applic., (2016) 2016:165.
[9] S. IVELIĆ BRADANOVIĆ, N. LATIF, Đ. PEČARIĆ AND J. PEČARIĆ, *Sherman and related inequalities with applications in information theory*, J. Inequal. Applic., (2018) 2018:98.
[10] R. JAKSIĆ, L. KVESIĆ AND J. PEČARIĆ, *On Weighted Generalization of the Hermite-Hadamard Inequality*, Math. Inequal. Applic., 18(2), (2015) 649–665.
[11] P. A. KLUZA AND M. NIEZGODA, *On Csiszár and Tsallis type f-divergences induced by superquadratic and convex functions*, Math.Inequal. Applic., 21(2), (2018), 455–467.
[12] N. LATIF, Đ. PEČARIĆ AND J. PEČARIĆ, *Majorization, Csiszár divergence and Zipf-Mandelbrot law*, J. Inequal. Applic., (2017) 2017:197.
[13] N. LOVRIČEVIĆ, Đ. PEČARIĆ AND J. PEČARIĆ, *Zipf-Mandelbrot law, f-divergences and Jensen-type interpolating inequalities*, J. Inequal. Applic., (2018) 2018:36.
[14] M. NIEZGODA, *Inequalities for H-invex functions with applications for uniformly convex and superquadratic functions*, J. Filomat, 31(15), (2017), 4781–4794.

Paper JMI-14-35

[15] M. NIEZGODA, *Vector joint majorization and generalization of Csiszár-Körner's inequality for f-divergence*, Discrete Appl. Math. 198 (2016), 195–205.
[16] C. NICULESCU AND L-E. PERSSON, *Convex functions and their applications, a contemporary approach*, Canad. Math. Series Books in Mathematics, Second Edition, Springer 2018.
[17] J. PEČARIĆ, F. PROSCHAN, Y. L. TONG, *Convex Functions, Partial Orderings, and Statistical Applications*, Academic Press, New York, 1992.
[18] S. SHERMAN, *On a theorem of Hardy, Littlewood, Pòlya and Blackwell*, Proc. Acad. Sci. USA, 37 (1957), 826–831.