

HÖLDER AND MINKOWSKI TYPE INEQUALITIES WITH ALTERNATING SIGNS

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Abstract. We obtain new inequalities with alternating signs of Hölder and Minkowski type.

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REFERENCES

- [1] E. BECKENBACH AND R. BELLMAN, *Inequalities*, Springer-Verlag, Berlin, 1961.
- [2] R. BELLMAN, *On an inequality due to Weinberger*, Amer. Math. Monthly **60** (1953), 402.
- [3] R. BELLMAN, *On inequalities with alternating signs*, Proc. Amer. Math. Soc. **10** (1959), 807–809.
- [4] Y. BENYAMINI AND J. LINDENSTRAUSS, *Geometric Nonlinear Functional Analysis. Vol. 1*, AMS Colloquium Publications, **48**, American Mathematical Society, Providence, RI, 2000.
- [5] M. BIERNACKI, *Sur des inégalités remplies par des expressions dont les termes ont des signes alternés*, Ann. Univ. Mariae Curie-Skłodowska. Sect. A. **7** (1953; 1954), 89–102.
- [6] M. BJELICA, *Refinement and converse of Brunk-Olkin inequality*, J. Math. Anal. Appl. **227**, 2 (1998), 462–467.
- [7] L. BOUGOFFA, *On Minkowski and Hardy integral inequalities*, J. Inequal. Pure Appl. Math. **7**, 2 (2006), Article 60, 3 pp.
- [8] H. D. BRUNK, *On an inequality for convex functions*, Proc. Amer. Math. Soc. **7** (1956), 817–824.
- [9] R. E. CASTILLO AND E. TROUSSELOT, *Reverse generalized Hölder and Minkowski type inequalities and their applications*, Bol. Mat. (N.S.) **17**, 2 (2010), 137–142.
- [10] G. H. HARDY, J. E. LITTLEWOOD, AND G. PÓLYA, *Inequalities*, Cambridge University Press, Cambridge, 1952.
- [11] E. LIFLYAND AND S. TIKHONOV, *A concept of general monotonicity and applications*, Math. Nachr. **284**, 8–9 (2011), 1083–1098.
- [12] B. MOND AND J. E. PEČARIĆ, *Szegő and related inequalities for operator-convex functions*, Soochow J. Math. **22**, 1 (1996), 33–37.
- [13] G. SZEGŐ, *Über eine Verallgemeinerung des Dirichletschen Integrals*, Math. Z. **52** (1950), 676–685.
- [14] I. OLKIN, *On inequalities of Szegő and Bellman*, Proc. Natl. Acad. Sci. USA. **45** (1959), 230–231; addendum, 1553.
- [15] J. E. PEČARIĆ, *On an inequality of G. Szegő*, J. Math. Anal. Appl. **158**, 2 (1991), 349–351.
- [16] J. F. STEFFENSEN, *Bounds of certain trigonometrical integrals*, C. R. Dixième Congrès Math. Scandinaves (1946), 181–186, Jul. Gjellerups Forlag, Copenhagen, 1947.
- [17] O. VALERO, *Quotient normed cones*, Proc. Natl. Acad. Sci. India **116**, 2 (2006), 175–191.
- [18] H. F. WEINBERGER, *An inequality with alternating signs*, Proc. Natl. Acad. Sci. USA. **38** (1952), 611–613.
- [19] E. M. WRIGHT, *An inequality for convex functions*, Amer. Math. Monthly **61** (1954), 620–622.
- [20] Y. D. ZHUANG, *On inverses of the Hölder inequality*, J. Math. Anal. Appl. **161**, 2 (1991), 566–575.