

## AN ALTERNATIVE NOTE ON THE SCHUR-CONVEXITY OF THE EXTENDED MEAN VALUES

HUAN-NAN SHI, SHAN-HE WU AND FENG QI

**Abstract.** The Schur-convex and Schur-concave properties with  $(x, y)$  in  $(0, \infty) \times (0, \infty)$  for fixed  $(r, s)$  of the extended mean values  $E(r, s; x, y)$  are researched again, some errors in [F. Qi, J. Sándor, S. S. Dragomir, and A. Sofo, *Notes on the Schur-convexity of the extended mean values*, Taiwanese J. Math. **9**, (3) (2005), 411–420. RGMIA Res. Rep. Coll. **5** (2002), no. 1, Art. 3, 19–27. Available online at URL: <http://rgmia.vu.edu.au/v5n1.html>.] are corrected.

*Mathematics subject classification (2000):* 26B25, 26E60, 26D07, 26D20.

*Key words and phrases:* Schur-convexity, extended mean values.

## REFERENCES

- [1] P. S. BULLEN, *Handbook of Means and Their Inequalities*, Mathematics and its Applications (Dordrecht) **560**, Kluwer Academic Publishers, Dordrecht, 2003.
- [2] CH.-P. CHEN, F. QI, *An alternative proof of monotonicity for the extended mean values*, Austral. J. Math. Anal. Appl., **1**, (2) (2004), Art. 11. Available online at URL: <http://ajmaa.org/cgi-bin/paper.pl?string=v1n2/V1I2P11.tex>.
- [3] CH.-P. CHEN, F. QI, *Another proof of monotonicity for the extended mean values*, Tamkang J. Math. **37**, (3) (2006), accepted.
- [4] N. ELEZOVIC, J. PEĆARIĆ, *A note on Schur-convex functions*, Rocky Mountain J. Math. **30**, (3) (2000), 853–856.
- [5] B.-N. GUO, SH.-Q. ZHANG AND F. QI, *Elementary proofs of monotonicity for extended mean values of some functions with two parameters*, Shùxué de Shǐjiàn yǔ Rènshí (Math. Practice Theory) **29**, (2) (1999), 169–174. (Chinese)
- [6] E. B. LEACH, M. C. SHOLANDER, *Extended mean values*, Amer. Math. Monthly **85**, (1978), 84–90.
- [7] E. LEACH, M. SHOLANDER, *Extended mean values II*, J. Math. Anal. Appl. **92**, (1983), 207–223.
- [8] A. W. MAESHALL, I. OLKIN, *Inequalities: Theory of Majorization and its Applications*, Academic Press, New York, 1979.
- [9] Z. PÁLES, *Inequalities for differences of powers*, J. Math. Anal. Appl. **131**, (1988), 271–281.
- [10] J. PEĆARIĆ, F. PROSCHAN, AND Y. L. TONG, *Convex Functions, Partial Orderings, and Statistical Applications*, Mathematics in Science and Engineering **187**, Academic Press, 1992.
- [11] F. QI, *A note on Schur-convexity of extended mean values*, Rocky Mountain J. Math. **35**, (5) (2005), 1787–1793.
- [12] F. QI, *Logarithmic convexity of extended mean values*, Proc. Amer. Math. Soc. **130**, (6) (2002), 1787–1796.
- [13] F. QI, *Logarithmic convexities of the extended mean values*, RGMIA Res. Rep. Coll. **2**, (5) (1999), Art. 5, 643–652. Available online at URL: <http://rgmia.vu.edu.au/v2n5.html>.
- [14] F. QI, *Schur-convexity of the extended mean values*, RGMIA Res. Rep. Coll. **4**, (4) (2001), Art. 4, 529–533. Available online at URL: <http://rgmia.vu.edu.au/v4n4.html>.
- [15] F. QI, *The extended mean values: definition, properties, monotonicities, comparison, convexities, generalizations, and applications*, Cubo Mat. Educ. **5**, (3) (2003), 63–90. RGMIA Res. Rep. Coll. **5**, (1) (2002), Art. 5, 57–80. Available online at URL: <http://rgmia.vu.edu.au/v5n1.html>.
- [16] F. QI, Q.-M. LUO, *A simple proof of monotonicity for extended mean values*, J. Math. Anal. Appl., **224**, (2) (1998), 356–359.

- [17] F. QI, J. SÁNDOR, S. S. DRAGOMIR AND A. SOFO, *Notes on the Schur-convexity of the extended mean values*, Taiwanese J. Math. **9**, (3) (2005), 411–420. RGMIA Res. Rep. Coll. **5**, (1) (2002), Art. 3, 19–27. Available online at URL: <http://rgmia.vu.edu.au/v5n1.html>.
- [18] F. QI, S.-L. XU, *The function  $(b^x - a^x)/x$ : Inequalities and properties*, Proc. Amer. Math. Soc. **126**, (11) (1998), 3355–3359.
- [19] F. QI, S.-L. XU AND L. DEBNATH, *A new proof of monotonicity for extended mean values*, Internat. J. Math. Math. Sci., **22**, (2) (1999), 415–420.
- [20] K. B. STOLARSKY, *Generalizations of the logarithmic mean*, Mag. Math., **48**, (1975), 87–92.
- [21] B.-Y. WANG, *Kǒngzhì Bùděngshí Jǐchǔ*, Beijing Normal University Press, Beijing, China, 1990. (Chinese)