

SOME COMPLETELY MONOTONIC FUNCTIONS INVOLVING THE q -GAMMA FUNCTION

PENG GAO

Abstract. We present some completely monotonic functions involving the q -gamma function that are inspired by their analogues involving the gamma function.

Mathematics subject classification (2010): 33D05.

Keywords and phrases: Completely monotonic function, q -gamma function.

REFERENCES

- [1] H. ALZER, *Some gamma function inequalities*, Math. Comp., **60** (1993), 337–346.
- [2] H. ALZER, *On some inequalities for the gamma and psi functions*, Math. Comp., **66** (1997), 373–389.
- [3] H. ALZER, *Sharp bounds for the ratio of q -gamma functions*, Math. Nachr., **222** (2001), 5–14.
- [4] H. ALZER, *Sharp inequalities for the digamma and polygamma functions*, Forum Math., **16** (2004), 181–221.
- [5] H. ALZER AND N. BATIR, *Monotonicity properties of the gamma function*, Appl. Math. Lett., **20** (2007), 778–781.
- [6] H. ALZER AND C. BERG, *Some classes of completely monotonic functions, II.*, Ramanujan J., **11** (2006), 225–248.
- [7] J. BUSTOZ AND M. E. H. ISMAIL, *On gamma function inequalities*, Math. Comp., **47** (1986), 659–667.
- [8] N. ELEZOVIĆ, C. GIORDANO AND J. PEČARIĆ, *A geometric mean inequality and some monotonicity results for the q -gamma function*, Math. Inequal. Appl., **1** (1998), 253–258.
- [9] N. ELEZOVIĆ, C. GIORDANO AND J. PEČARIĆ, *The best bounds in Gautschi's inequality*, Math. Inequal. Appl., **3** (2000), 239–252.
- [10] N. ELEZOVIĆ AND J. PEČARIĆ, *Differential and integral f -means and applications to digamma function*, Math. Inequal. Appl., **3** (2000), 189–196.
- [11] P. GAO, *A note on the volume of sections of B_p^n* , J. Math. Anal. Appl., **326** (2007), 632–640.
- [12] P. GAO, *Some monotonicity properties of gamma and q -gamma functions*, ISRN Math. Anal., (2011) 2011, Art. ID 375715, 15 pp.
- [13] A. Z. GRINSHPAN AND M. E. H. ISMAIL, *Completely monotonic functions involving the gamma and q -gamma functions*, Proc. Amer. Math. Soc., **134** (2006), 1153–1160.
- [14] M. E. H. ISMAIL AND M. E. MULDOON, *Inequalities and monotonicity properties for gamma and q -gamma functions*, In: Approximation and computation, Internat. Ser. Numer. Math., **119**, Birkhäuser, Boston, 1994, 309–323.
- [15] H.-H. KAIRIES AND M. E. MULDOON, *Some characterizations of q -factorial functions*, Aequationes Math., **25** (1982), 67–76.
- [16] D. KERSHAW, *Some extensions of W. Gautschi's inequalities for the gamma function*, Math. Comp., **41** (1983), 607–611.
- [17] T. H. KOORNWINDER, *Jacobi functions as limit cases of q -ultraspherical polynomials*, J. Math. Anal. Appl., **148** (1990), 44–54.
- [18] C. KRATTENTHALER AND H. M. SRIVASTAVA, *Summations for basic hypergeometric series involving a q -analogue of the digamma function*, Comput. Math. Appl., **32** (1996), 73–91.

- [19] M. E. MULDOON, *Some monotonicity properties and characterizations of the gamma function*, Aequationes Math., **18** (1978), 54–63. A. B. OLDE DAALHUIS, *Asymptotic expansions for q -gamma, q -exponential, and q -Bessel functions*, J. Math. Anal. Appl., **186** (1994)
- [20] S.-L. QIU AND M. VUORINEN, *Some properties of the gamma and psi functions, with applications*, Math. Comp., **74** (2005), 723–742.
- [21] K. B. STOLARSKY, *Generalizations of the logarithmic mean*, Math. Mag., **48** (1975), 87–92.