

ASYMPTOTIC EXPANSION OF THE ARITHMETIC-GEOMETRIC MEAN AND RELATED INEQUALITIES

TOMISLAV BURIĆ AND NEVEN ELEZOVIĆ

Abstract. Asymptotic expansion of the arithmetic-geometric mean is obtained and it is used to analyze inequalities and relations between arithmetic-geometric mean and other classical means.

Mathematics subject classification (2010): 26E60, 41A60.

Keywords and phrases: Arithmetic-geometric mean, asymptotic expansions, asymptotic inequalities.

REFERENCES

- [1] M. ABRAMOWITZ AND I. A. STEGUN (Eds), *Handbook of Mathematical Functions with Formulas, Graphs, and Mathematical Tables*, National Bureau of Standards, Applied Mathematics Series **55**, 9th printing, Washington, 1970.
- [2] G. E. ANDREWS, R. A. ASKEY, AND R. ROY, *Special Functions*, Cambridge University Press, Cambridge, 1999.
- [3] P. BRACKEN, *An arithmetic-geometric mean inequality*, *Expo. Math.*, **19** (2001), 273–279.
- [4] P. S. BULLEN, *Averages still on the move*, *Math. Mag.*, **63** (1990), 250–255.
- [5] P. S. BULLEN, *Handbook of Means and Their Inequalities*, Kluwer Academic Publisher, Dordrecht/Boston/London, 2003.
- [6] P. S. BULLEN, D. S. MITRINović AND P. M. VASIĆ, *Means and theirs inequalities*, D Reidel, Dordrecht, 1988.
- [7] T. BURIĆ, N. ELEZOVIĆ, *Bernoulli polynomials and asymptotic expansions of the quotient of gamma functions*, *J. Comput. Appl. Math.*, **235**, 11 (2011), 3315–3331.
- [8] T. BURIĆ, N. ELEZOVIĆ, *New asymptotic expansions of the gamma function and improvements of Stirling's type formulas*, *J. Comput. Anal. Appl.*, **13**, 4 (2011), 785–795.
- [9] T. BURIĆ, N. ELEZOVIĆ, *New asymptotic expansions of the quotient of gamma functions*, *Integral Transforms Spec. Funct.*, **23** (2012), 355–368.
- [10] T. BURIĆ, N. ELEZOVIĆ, *Approximations of the Euler-Mascheroni constant and harmonic numbers*, *Appl. Math. Comput.*, **222** (2013), 604–611.
- [11] T. BURIĆ, N. ELEZOVIĆ, *Asymptotic expansions of the binomial coefficients*, *J. Appl. Math. Comput.*, **46** (2014), 135–145.
- [12] C.-P. CHEN, N. ELEZOVIĆ AND L. VUKŠIĆ, *Asymptotic formulae associated with the Wallis power function and digamma function*, *J. Class. Anal.*, **2** (2013), 151–166.
- [13] N. ELEZOVIĆ, *Asymptotic inequalities and comparison of classical means*, *J. Math. Inequal.*, **9**, 1 (2015), 177–196.
- [14] N. ELEZOVIĆ, *Asymptotic expansions of gamma and related functions, binomial coefficients, inequalities and means*, *J. Math. Inequal.*, **9**, 4 (2015), 1001–1054.
- [15] N. ELEZOVIĆ AND J. PEČARIĆ, *Differential and integral f -means and applications to digamma function*, *Math. Inequal. Appl.*, **3** (2000), 189–196.
- [16] N. ELEZOVIĆ, L. VUKŠIĆ, *Asymptotic expansions of integral means and applications to the ratio of gamma functions*, *Appl. Math. Comput.*, **235** (2014), 187–200.
- [17] N. ELEZOVIĆ AND L. VUKŠIĆ, *Asymptotic expansions of bivariate classical means and related inequalities*, *J. Math. Inequal.*, **8** (2014), 707–724.
- [18] N. ELEZOVIĆ AND L. VUKŠIĆ, *Asymptotic expansions and comparison of bivariate parameter means*, *Math. Inequal. Appl.*, **17** (2014) 1225–1244.

- [19] F. QI, A. SOFO, *An alternative and united proof of a double inequality for bounding the arithmetic-geometric mean*, U.P.B. Sci. Bull. **71** (2009) 69–76.
- [20] M. K. VAMANAMURTHY AND M. VUORINEN, *Inequalities for means*, J. Math. Anal. Appl., **183** (1994), 155–166.