

ON CERTAIN CONJECTURES FOR THE TWO SEIFFERT MEANS

CHAO-PING CHEN AND JÓZSEF SÁNDOR

Abstract. In 2015 Vukšić, by using the asymptotic expansion method, conjectured certain inequalities related to the first and second Seiffert means. In this paper, we prove certain conjectures given by Vukšić.

Mathematics subject classification (2010): 26E60, 26D05.

Keywords and phrases: Seiffert means, inequality.

REFERENCES

- [1] C.-P. CHEN AND W.-S. CHEUNG, *Wilker- and Huygens-type inequalities and solution to Oppenheim's problem*, Integral Transforms Spec. Funct. **23**, 5 (2012), 325–336.
- [2] C.-P. CHEN AND N. ELEZOVIĆ, *Proofs of certain conjectures of Vukšić concerning the inequalities for means*, Math. Inequal. Appl. **20** (2017), no. 4, 1159–1182.
- [3] Y. M. CHU, Y. F. QIU, M. K. WANG AND G. D. WANG, *The optimal convex combination bounds of arithmetic and harmonic means for the Seiffert's mean*, J. Inequal. Appl. **2010**, Article ID 436457, 7 pages.
- [4] Y. M. CHU, M. K. WANG AND W. M. GONG, *Two sharp double inequalities for Seiffert mean*, J. Inequal. Appl. **2011**, Article 44, 7 pages.
- [5] Y. M. CHU, C. ZONG AND G. D. WANG, *Optimal convex combination bounds of Seiffert and geometric means for the arithmetic mean*, J. Math. Inequal. **5** (2011), 429–434.
- [6] A. CUYT, V. B. PETERSEN, B. VERDONK, H. WAADEL AND, W. B. JONES, *Handbook of Continued Fractions for Special Functions*, Springer, New York, 2008.
- [7] N. ELEZOVIĆ, *Asymptotic inequalities and comparison of classical means*, J. Math. Inequal. **9**, 1 (2015) 177–196.
- [8] N. ELEZOVIĆ, *Asymptotic expansions of gamma and related functions, binomial coefficients, inequalities and means*, J. Math. Inequal. **9**, 4 (2015), 1001–1054.
- [9] N. ELEZOVIĆ, AND L. VUKŠIĆ, *Asymptotic expansions of bivariate classical means and related inequalities*, J. Math. Inequal. **8**, 4 (2014), 707–724.
- [10] S.-Q. GAO, H.-Y. GAO AND W.-Y. SHI, *Optimal convex combination bounds of the centroidal and harmonic means for the Seiffert mean*, Int. J. Pure Appl. Math. **70** (2011), 701–709.
- [11] P. HASTO, *Optimal inequalities between Seiffert's mean and power mean*, Math. Ineq. Appl. **7**, 1 (2004), 47–53.
- [12] A. A. JAGERS, *Solution of Problem 887*, Nieuw Arch. Wiskunde **12**, 4 (1994), 230–231.
- [13] H. LIU AND X. J. MENG, *The optimal convex combination bounds for Seiffert's mean*, J. Inequal. Appl. **2011**, Article ID 686834, 9 pages.
- [14] E. NEUMAN AND J. SÁNDOR, *On the Schwab-Borchardt mean*, Math. Pannonica **14**, 2 (2003), 253–266.
- [15] E. NEUMAN AND J. SÁNDOR, *On the Schwab-Borchardt mean II*, Math. Pannonica **17**, 1 (2006), 49–59.
- [16] J. SÁNDOR, *On certain inequalities for means II*, J. Math. Anal. Appl. **199** (1996), 629–635.
- [17] J. SÁNDOR, *On certain inequalities for means III*, Arch. Math. (Basel), **76** (2001), 34–40.
- [18] J. SÁNDOR, *Über Zwei Mittel von Seiffert*, Wurzel **36** (2002), 104–107.
- [19] H.-J. SEIFFERT, *Problem 887*, Nieuw Arch. Wiskunde **11** (1993), 176.
- [20] H.-J. SEIFFERT, *Aufgabe 16*, Wurzel **29** (1995), 87.

- [21] H.-J. SEIFFERT, *Ungleichungen für einen bestimmten Mittelwert*, Nieuw Arch. Wiskunde **13** (1995), 195–198.
- [22] L. VUKŠIĆ, *Seiffert means, asymptotic expansions and inequalities*, Rad Hrvat. Akad. Znan. Umjet. Mat. Znan. **19** (2015), 129–142.
- [23] A. WITKOWSKI, *Interpolations of Schwab-Borchardt mean*, Math. Ineq. Appl. **16**, 1 (2013), 193–206.