BOUNDS IMPROVEMENT FOR ALTERNATING MATHIEU TYPE SERIES

TIBOR K. POGÁNY AND ŽIVORAD TOMOVSKI

Abstract. The aim of this research paper is to establish some precise, new bounding inequalities for the generalized alternating Mathieu series using their integral representations and the classical CBS inequality. The obtained inequalities improve certain bounds derived recently by Tomovski and Hilfer in [17].

REFERENCES

[1] H. ALZER, *Sharp inequalities for the beta function*, Indag. Mathem. N.S., **12**, 1 (2001), 15–21.

[2] B. C. BERNDT, *Chapter 11 of Ramanujan's second notebook*, Bull. London Math. Soc., **15** (1983), 273-320.

[3] P. CERONE AND C. T. LENARD, *On integral forms of generalized Mathieu series*, J. Inequal. Pure Appl. Math., **4**, 5 (2003), Art. 100.

[4] P. H. DIANANDA, *Some inequalities related to an inequalities of Mathieu*, Math. Ann., **250** (1980), 95–98.

[5] S. S. DRAGOMIR, R. P. AGARWAL AND N. S. BARNETT, *Inequalities for beta and gamma functions via some classical and new integral inequalities*, J. Inequal. Appl., **5** (2000), 103–165.

[6] I. S. GRADSHTEYN, I. M. RYZHIK, *Table of Integrals, Series, and Products* (Corrected and Enlarged Edition prepared by A. Jeffrey and D. Zwillinger), Sixth ed. Academic Press, New York, 2000.

[7] É. L. MATHIEU, *Traité de Physique Mathematique. VI–VII: Theory de l'Elasticité des Corps Solides* (Part 2), Gauthier–Villars, Paris, 1890.

[8] T. K. POGÁNY, Ž. TOMOVSKI, *On Mathieu–type series whose terms contain generalized hypergeometric function $_pF_q$ and Meijer's G–function*, Math. Comput. Modelling, **47**, 9–10 (2008), 952-969.

[9] T. K. POGÁNY, H. M. SRIVASTAVA AND Ž. TOMOVSKI, *Some families of Mathieu **a**-series and alternating Mathieu **a**-series*, Appl. Math. Comput., **173** (2006), 69–108.

[10] FENG QI, *An integral expression and some inequalities of Mathieu type series*, Rostock Math. Kolloq., **58** (2004), 37–46.

[11] K. SCHRÖDER, *Das Problem der eingespannten rechteckigen elastischen Platte I.: Die biharmonische Randwertaufgabe für das Rechteck*, Math. Anal., **121** (1949), 247–326.

[12] H. M. SRIVASTAVA, M. C. DAOUST, *On Eulerian integrals associated with Kampé de Fériet function*, Publ. Inst. Math. (Beograd)(N. S.), **9**, 23 (1969), 199–202.

[13] H. M. SRIVASTAVA, M. C. DAOUST, *A note on the convergence of Kampé de Fériet double hypergeometric series*, Math. Nachr., **53** (1972), 151–159.

[14] H. M. SRIVASTAVA, Ž. TOMOVSKI, *Some problems and solutions involving Mathieu series and its generalizations*, JIPAM J. Inequal. Pure Appl. Math., **5**, 2 (2004), Art.45.

[15] Ž. TOMOVSKI, *New double inequality for Mathieu series*, Univ. Belgrade Publ. Elektrotehn. Fak. Ser. Mat., **15** (2004), 79–83.

[16] Ž. TOMOVSKI, *Integral representations of generalized Mathieu series via Mittag–Leffler type functions*, Fract. Calc. & Appl. Anal., **10**, 2 (2007), 127–138.

[17] Ž. TOMOVSKI, R. HILFER, *Some bounds for alternating Mathieu type series*, J. Math. Inequal., **2**, 1 (2008), 17–26.

[18] Ž. TOMOVSKI, T. K. POGÁNY, *New upper bounds for Mathieu–type series*, Banach J. Math. Anal., **3**, 2 (2009), 9–15.

[19] Ž. TOMOVSKI, K. TRENČEVSKI, *On an open problem of Bai-Ni Guo and Feng Qi*, J. Inequal. Pure Appl. Math., **4**, 2 (2003), Art. 29.

Journal of Mathematical Inequalities
www.ele-math.com
jmi@ele-math.com