REFINEMENTS AND REVERSES OF MEANS INEQUALITIES
FOR HILBERT SPACE OPERATORS

OMAR HIRZALLAH¹, FUAD KITTANEH²*, MARIO KRNIĆ³, NEDA LOVRIČEVIC⁴ AND JOSIP PEČARIĆ⁵

Communicated by M. Fujii

ABSTRACT. In this paper we derive some improvements of means inequalities for Hilbert space operators. More precisely, we obtain refinements and reverses of the arithmetic-geometric operator mean inequality. As an application, we also deduce an improved variant for the refined arithmetic–Heinz mean inequality. We also present some eigenvalue inequalities for differences of certain operator means.

¹ DEPARTMENT OF MATHEMATICS, HASHEMITE UNIVERSITY, ZARQA, JORDAN.
E-mail address: o.hirzal@hu.edu.jo

² DEPARTMENT OF MATHEMATICS, UNIVERSITY OF JORDAN, AMMAN, JORDAN.
E-mail address: f.kitt@ju.edu.jo

³ UNIVERSITY OF ZAGREB, FACULTY OF ELECTRICAL ENGINEERING AND COMPUTING, UNSKA 3, 10000 ZAGREB, CROATIA.
E-mail address: mario.krnic@fer.hr

⁴ UNIVERSITY OF SPLIT, FACULTY OF CIVIL ENGINEERING AND ARCHITECTURE, MATICE HRVATSKIE 15, 21 000 SPLIT, CROATIA.
E-mail address: neda.lovricevic@gradst.hr

⁵ UNIVERSITY OF ZAGREB, FACULTY OF TEXTILE TECHNOLOGY, PIEROTTIJEVA 6, 10000 ZAGREB, CROATIA.
E-mail address: pecaric@element.hr

Date: Received: 1 July 2012; revised: 4 October 2012; Accepted: 30 October 2012.
* Corresponding author.
2010 Mathematics Subject Classification. Primary 47A63; Secondary 47A10, 47B06, 47B07, 47B15, 26D20.
Key words and phrases. Positive operator, compact operator, operator mean, refinement, eigenvalue.