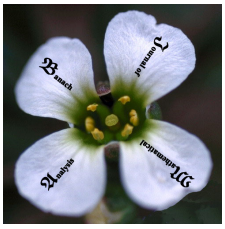

Banach J. Math. Anal. 7 (2013), no. 2, 162–171

Banach Journal of Mathematical Analysis
ISSN: 1735-8787 (electronic)
www.emis.de/journals/BJMA/

MATRIX INEQUALITIES RELATED TO HÖLDER INEQUALITY

HUSSIEN ALBADAWI

Communicated by M. Fujii

Abstract. Matrix inequalities of Hölder type are obtained. Among other inequalities, it is shown that if $2 \leq p, q < \infty$ and $r > 1$ with $1/p+1/q = 1-1/r$, then for any $A_i, B_i \in M_n(\mathbb{C})$ and $\alpha_i \in [0,1]$ $(i = 1, 2, \cdots, m)$ with $\sum_{i=1}^{m} \alpha_i = 1$, we have

$$\left| \sum_{i=1}^{m} \alpha_i^{1/r} B_i A_i \right| \leq \left(\sum_{i=1}^{m} |A_i|^p \right)^{1/p}$$

whenever $\sum_{i=1}^{m} |B_i^*|^q \leq I$. Related unitarily invariant norm inequalities are also presented.

Preparatory Year Deanship, King Faisal University, Ahsaa, Saudi Arabia.
E-mail address: albadawi1@gmail.com

Date: Received: 29 November 2012; Accepted: 3 January 2013.
2010 *Mathematics Subject Classification.* Primary 15A45; Secondary 47A30, 15A60, 15B48.
Key words and phrases. Hölder's inequality, unitarily invariant norm, norm inequality, m-tuple of matrices.