

Banach J. Math. Anal. 2 (2008), no. 2, 76–84

BANACH JOURNAL OF MATHEMATICAL ANALYSIS ISSN: 1735-8787 (electronic) http://www.math-analysis.org

## THE HARDY INEQUALITY WITH ONE NEGATIVE PARAMETER

## A. KUFNER<sup>1</sup>, K. KULIEV<sup>2\*</sup> AND G. KULIEVA<sup>3</sup>

Dedicated to Professor Josip E. Pečarić

## Submitted by C. Park

ABSTRACT. In this paper, necessary and sufficient conditions for the validity of the Hardy inequality for the case q < 0, p > 0 and for the case q > 0, p < 0 are derived.

<sup>1</sup> MATHEMATICAL INSTITUTE, ACADEMY OF SCIENCES OF THE CZECH REPUBLIC, ŽITNA 25, 11567 PRAHA 1, CZECH REPUBLIC *E-mail address:* kufner@math.cas.cz

 $^2$  Department of Mathematics, University of West Bohemia, Univerzitní 22, 30614 Pilsen, Czech Republic

*E-mail address*: komil@kma.zcu.cz

<sup>3</sup> DEPARTMENT OF MATHEMATICS, UNIVERSITY OF WEST BOHEMIA, UNIVERZITNÍ 22, 30614 PILSEN, CZECH REPUBLIC

*E-mail address*: kulievag@mail.ru

Date: Received: 19 February 2008; Accepted: 3 June 2008.

\* Corresponding author.

2000 Mathematics Subject Classification. Primary 26D10, 26D15; Secondary 47B38. Key words and phrases. Inequalities, Hardy-type inequalities, weights, negative powers.