



Ann. Funct. Anal. 3 (2012), no. 2, 115–127

ANNALS OF FUNCTIONAL ANALYSIS

ISSN: 2008-8752 (electronic)

URL: www.emis.de/journals/AFA/

RANK EQUALITIES FOR MOORE-PENROSE INVERSE AND DRAZIN INVERSE OVER QUATERNION

HUASHENG ZHANG

Communicated by Q.-W. Wang

ABSTRACT. In this paper, we consider the ranks of four real matrices G_i ($i = 0, 1, 2, 3$) in M^\dagger , where $M = M_0 + M_1i + M_2j + M_3k$ is an arbitrary quaternion matrix, and $M^\dagger = G_0 + G_1i + G_2j + G_3k$ is the Moore-Penrose inverse of M . Similarly, the ranks of four real matrices in Drazin inverse of a quaternion matrix are also presented. As applications, the necessary and sufficient conditions for M^\dagger is pure real or pure imaginary Moore-Penrose inverse and N^D is pure real or pure imaginary Drazin inverse are presented, respectively.

DEPARTMENT OF MATHEMATICS, LIAOCHENG UNIVERSITY, SHANDONG252059, P.R. CHINA.
E-mail address: zhsh0510@163.com; zhsh0510@yahoo.com.cn

Date: Received: 30 December 2012; Accepted: 9 April 2012.

2010 Mathematics Subject Classification. Primary 15A03; Secondary 15A09, 15A24, 15A33.

Key words and phrases. Moore-penrose inverse, rank, quaternion matrix, Drazin inverse.