



Ann. Funct. Anal. 5 (2014), no. 2, 176–187

ANNALS OF FUNCTIONAL ANALYSIS

ISSN: 2008-8752 (electronic)

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

PRINCIPAL ANGLES AND APPROXIMATION FOR QUATERNIONIC PROJECTIONS

TERRY A. LORING

*This paper is dedicated to Professor Tsuyoshi Ando, in celebration of his expertise in matrix
and operator theory*

Communicated by G. Androulakis

ABSTRACT. We extend Jordan's notion of principal angles to work for two subspaces of quaternionic space, and so have a method to analyze two orthogonal projections in the matrices over the real, complex or quaternionic field (or skew field). From this we derive an algorithm to turn almost commuting projections into commuting projections that minimizes the sum of the displacements of the two projections. We quickly prove what we need using the universal real C^* -algebra generated by two projections.

DEPARTMENT OF MATHEMATICS AND STATISTICS, UNIVERSITY OF NEW MEXICO, ALBUQUERQUE, NM 87131, USA.

E-mail address: loring@math.unm.edu

Date: Received: June 8, 2013; Accepted: December 13, 2013.

2010 Mathematics Subject Classification. Primary 15B33; Secondary 46L05.

Key words and phrases. Principal angles, subspace, projection, quaternions.