

A NEW EQUIVALENT CONDITION OF THE REVERSE ORDER LAW FOR G -INVERSES OF MULTIPLE MATRIX PRODUCTS*

BING ZHENG[†] AND ZHIPING XIONG[†]

Abstract. In 1999, Wei [M.We, Reverse order laws for generalized inverse of multiple matrix products, Linear Algebra Appl., 293 (1999), pp. 273-288] studied reverse order laws for generalized inverses of multiple matrix products and derived some necessary and sufficient conditions for

$$A_n\{1\}A_{n-1}\{1\}\cdots A_1\{1\} \subseteq (A_1A_2\cdots A_n)\{1\}$$

by using P-SVD (Product Singular Value Decomposition). In this paper, using the maximal rank of the generalized Schur complement, a new simpler equivalent condition is obtained in terms of only the ranks of the known matrices for this inclusion.

Key words. Reverse order law, Generalized inverse, Matrix product, Maximal rank, Generalized Schur complement.

AMS subject classifications. 15A03, 15A09.

*Received by the editors June 28, 2007. Accepted for publication December 24, 2007. Handling Editor: Bit-Shun Tam.

[†]School of Mathematics and Statistics, Lanzhou University, Lanzhou 730000, P.R. China (bzheng@lzu.edu.cn, xiongzhp04@lzu.cn). First author supported by start-up fund of Lanzhou University and the Natural Science Foundation (3ZS051-A25-020) of Gansu Province.