Electronic Journal of Linear Algebra ISSN 1081-3810
A publication of the International Linear Algebra Society
Volume 17, pp. 426-435, September 2008

ELA
http://math.technion.ac.il/iic/ela

NONNEGATIVITY OF SCHUR COMPLEMENTS OF NONNEGATIVE IDEMPOTENT MATRICES*

SHMUEL FRIEDLAND† AND ELENA VIRNIK‡

Abstract. Let A be a nonnegative idempotent matrix. It is shown that the Schur complement of a submatrix, using the Moore-Penrose inverse, is a nonnegative idempotent matrix if the submatrix has a positive diagonal. Similar results for the Schur complement of any submatrix of A are no longer true in general.

Key words. Nonnegative idempotent matrices, Schur complement, Moore-Penrose inverse, generalized inverse.

AMS subject classifications. 15A09, 15A15, 15A48.

*Received by the editors April 22, 2008. Accepted for publication August 12, 2008. Handling Editor: Miroslav Fiedler. This research is partly supported by the DFG Research Center MATHEON in Berlin.

†Department of Mathematics, Statistics, and Computer Science, University of Illinois at Chicago, 322 Science and Engineering Offices (M/C 249), 851 S. Morgan Street Chicago, IL 60607-7045 (friedlan@uic.edu), and Visiting Professor, Berlin Mathematical School, Institut für Mathematik, Technische Universität Berlin, Strasse des 17. Juni 136, D-10623 Berlin, FRG.

‡Institut für Mathematik, TU Berlin, Str. des 17. Juni 136, D-10623 Berlin, FRG (virnik@math.tu-berlin.de).