Electronic Journal of Linear Algebra ISSN 1081-3810
A publication of the International Linear Algebra Society
Volume 15, pp. 239-250, August 2006

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

AN EIGENVALUE INEQUALITY AND SPECTRUM LOCALIZATION FOR COMPLEX MATRICES*

MARIA ADAM† AND MICHAEL J. TSATSOMEROS‡

Abstract. Using the notions of the numerical range, Schur complement and unitary equivalence, an eigenvalue inequality is obtained for a general complex matrix, giving rise to a region in the complex plane that contains its spectrum. This region is determined by a curve, generalizing and improving classical eigenvalue bounds obtained by the Hermitian and skew-Hermitian parts, as well as the numerical range of a matrix.

Key words. Eigenvalues, Inclusion regions, Numerical range, Hermitian part.

AMS subject classifications. 15A18, 15A60.

*Received by the editors 9 December 2005. Accepted for publication 28 August 2006. Handling Editor: Raphael Lowey. Research supported by a grant of the EPEAEK project Pythagoras II. The project is co-funded by the European Social Fund (75%) and Greek National Resources (25%).

†Department of Mathematics, National Technical University of Athens, Athens 15780, Greece (maria@math.ntua.gr).

‡Mathematics Department, Washington State University, Pullman, WA 99164-3113, U.S.A. (tsat@wsu.edu).