Electronic Journal of Linear Algebra ISSN 1081-3810
A publication of the International Linear Algebra Society
Volume 18, pp. 281-288, June 2009

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

THE JORDAN FORMS OF AB AND BA^*

ROSS A. LIPPERT† AND GILBERT STRANG‡

Abstract. The relationship between the Jordan forms of the matrix products AB and BA for some given A and B was first described by Harley Flanders in 1951. Their non-zero eigenvalues and non-singular Jordan structures are the same, but their singular Jordan block sizes can differ by 1. We present an elementary proof that owes its simplicity to a novel use of the Weyr characteristic.

Key words. Jordan form, Weyr characteristic, eigenvalues

AMS subject classifications. 15A21, 15A18

* Received by the editors May 5, 2009. Accepted for publication May 28, 2009. Handling Editor: Roger A. Horn.

† 123 West 92 Street #1, New York, NY 10025, USA (ross.lippert@gmail.com).

‡ MIT Department of Mathematics, 77 Massachusetts Avenue, Building Room 2-240, Cambridge, MA 02139, USA, (gs@math.mit.edu).