Electronic Journal of Linear Algebra ISSN 1081-3810
A publication of the International Linear Algebra Society
Volume 22, pp. 573-585, May 2011

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

STRUCTURED QR ALGORITHMS FOR HAMILTONIAN SYMMETRIC MATRICES*

A. SALAM† AND D.S. WATKINS‡§

Abstract. Efficient, backward-stable, doubly structure-preserving algorithms for the Hamiltonian symmetric and skew-symmetric eigenvalue problems are developed. Numerical experiments confirm the theoretical properties of the algorithms. Also developed are doubly structure-preserving Lanczos processes for Hamiltonian symmetric and skew-symmetric matrices.

Key words. Hamiltonian matrix, Double structure, Eigenvalue, QR algorithm.

AMS subject classifications. 65F15, 15A18, 15A21.

*Received by the editors on September 8, 2009. Accepted for publication on May 20, 2011. Handling Editor: Angelika Bunse-Gerstner.

†Univ Lille Nord de France, F-59650 Lille, ULCO LMPA, C.U. de la Mi-Voix, B.P. 699, F-62228 Calais, France (Ahmed.Salam@lmpa.univ-littoral.fr).

‡Department of Mathematics, Washington State University, Pullman, WA 99164-3113, USA (watkins@math.wsu.edu).

§This work was carried out while the second author was visiting the first author in Calais.