Electronic Journal of Linear Algebra ISSN 1081-3810 A publication of the International Linear Algebra Society Volume 22, pp. 598-619, June 2011



NEW FAMILIES OF INTEGER MATRICES WHOSE LEADING PRINCIPAL MINORS FORM SOME WELL-KNOWN SEQUENCES*

ALI REZA MOGHADDAMFAR[†], KAMBIZ MOGHADDAMFAR[‡], and HADISEH TAJBAKHSH[‡]

Abstract. The purpose of this article is to obtain some new infinite families of Toeplitz matrices, 7-matrices and generalized Pascal triangles whose leading principal minors form the Fibonacci, Lucas, Pell and Jacobsthal sequences. We also present a new proof for Theorem 3.1 in [R. Bacher. Determinants of matrices related to the Pascal triangle. J. Théor. Nombres Bordeaux, 14:19–41, 2002.].

Key words. Fibonacci sequence, Lucas sequence, Pell sequence, Jacobsthal sequence, Determinant, Toeplitz matrix, 7-matrix, Generalized Pascal triangle, Matrix factorization, Recurrence relation.

AMS subject classifications. 15A09, 15A36, 11C20.

In memory of Professor Michael Neumann.

^{*}Received by the editors on November 18, 2010. Accepted for publication on May 20, 2011. Handling Editor: Michael Neumann.

[†]Department of Mathematics, K.N. Toosi University of Technology, PO Box 16315-1618, Tehran, Iran (moghadam@kntu.ac.ir), and School of Mathematics, Institute for Research in Fundamental Sciences (IPM), PO Box 19395-5746, Tehran, Iran (moghadam@ipm.ir). This article was prepared while the author was visiting the Institute for Research in Fundamental Sciences (IPM). It would be a pleasure to thank IPM for its hospitality and facilities.

[‡]Department of Mathematics, K.N. Toosi University of Technology, PO Box 16315-1618, Tehran, Iran.