

REACHABILITY MATRICES AND CYCLIC MATRICES*

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Abstract. We study reachability matrices $R(A, b) = [b, Ab, \dots, A^{n-1}b]$, where A is an $n \times n$ matrix over a field K and b is in K^n . We characterize those matrices that are reachability matrices for some pair (A, b) . In the case of a cyclic matrix A and an n -vector of indeterminates x , we derive a factorization of the polynomial $\det(R(A, x))$.

Key words. Reachability matrix, Krylow matrix, cyclic matrix, nonderogatory matrix, companion matrix, Vandermonde matrix, Hautus test.

AMS subject classifications. 15A03, 15A15, 93B05.

*Received by the editors September 23, 2009. Accepted for publication February 11, 2010. Handling Editor: Daniel Szyld.

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