

MATRICIAL DECOMPOSITION OF SYSTEMS OVER RINGS*

ANDRÉS SÁEZ-SCHWEDT†

Abstract. This paper extends to non-controllable linear systems over rings the property FC^s ($s > 0$), which means “feedback cyclization with s inputs”: given a controllable system (A, B) , there exist a matrix K and a matrix U with s columns such that $(A + BK, BU)$ is controllable. Clearly, FC^1 is the usual FC property. The main technique used in this work is the obtention of block decompositions for systems, with controllable subsystems of a certain size. Each of the studied decompositions is associated to a class of commutative rings for which all systems can be decomposed accordingly. Finally, examples are shown of FC^s rings (for $s > 1$) which are not FC rings.

Key words. Systems over commutative rings, Pole assignability.

AMS subject classifications. 93B52, 93B55, 13C99.

*Received by the editors April 18, 2008. Accepted for publication September 29, 2008. Handling Editor: Robert Guralnick.

†Departamento de Matemáticas, Universidad de León, Campus de Vegazana, 24071 León, Spain (asaes@unileon.es). Partially supported by Spanish grants MTM2005-05207 (M.E.C.) and LE026A06 (Junta de Castilla y León).