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Controllability of nonlinear multidimensional control systems. (English) Zbl 1127.93334

Isidori, Alberto (ed.) et al., Nonlinear control in the year 2000. Vol. 2. London: Springer (ISBN 1-85233-364-2). Lect. Notes Control Inf. Sci. 259, 245-255 (2001).

Summary: It is now known that the controllability of a linear multidimensional control system is a structural property equivalent to the lack of torsion of the corresponding differential module and can be tested, even in the case of nonconstant coefficients. It is therefore tempting to decide about the controllability of a nonlinear control system through the controllability of its generic linearization. The main purpose of this paper is to answer this question negatively, in general, by presenting for the first time the counterexample of a nonlinear system which is controllable while its generic linearization is not controllable. We also provide a test for searching autonomous observables, extending the one already existing in the 1-dimensional case.

For the entire collection see [Zbl 0953.00023].

MSC:

93C10 Nonlinear systems in control theory
93B15 Realizations from input-output data
93B20 Minimal systems representations
93C20 Control/observation systems governed by partial differential equations

Keywords:

controllability; nonlinear systems; differential modules; multidimensional systems

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