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Towards a differential algebraic decision methods toolbox for systems theory

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In last decades some systems theory questions have received differential algebraic partial answers. Among them obtaining input-output equations describing a system from its state space equations. This has been identified as a direct application of elimination theory, and Seidenberg seminal paper [2] has been one of the first differential algebraic decision methods which found its use in questions which are crucial in some areas of systems theory, namely, identification of systems parameters. Another important question of systems theory received a quite decent partial answer: observability and some related other observation problems occuring in systems design practice. The differential algebraic approach of this class of systems theory lead to decision methods stemming from the works of Ritt [1] and Kolchin [3]. In this contribution the previous two systems questions as well as others with differential algebraic decision methods partial answers are presented as building blocks of a toolbox for users who may not be familiar with the differential algebraic geometry machinery which underlies them.

Keywords
Differential algebraic decision methods, Systems theory, Control theory

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