

Study of controllability of two-order singular systems under an algebraic point of view

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Abstract:- Let (E, A_1, A_2, B) be a quadruple of matrices representing a two-order singular time-invariant linear system, $E\ddot{x} = A_1\dot{x} + A_2x + Bu$. It is well known that a two-order singular linear system is called controllable if, for any $t_1 > 0$, $x(0), \dot{x}(0) \in \mathbb{C}^n$ and $w, w_1 \in \mathbb{C}^n$, there exists a control $u(t)$ such that $x(t_1) = w$, $\dot{x}(t_1) = w_1$.

We present a study of controllability of two-order singular systems under an algebraic point of view, concretely by means the rank of a certain matrix that we will call controllability matrix of two-order generalized linear systems. This condition may be used for study the geometry of the set of uncontrollable systems in the open set of standardizable systems.