

POLYNOMIAL SOLUTION OF DESCRIPTOR SYSTEM

Author: *Le Hai Trung*

University of Education - The University of Danang; lhtrung@ued.udn.vn

Abstract:

The aim of article is to prove that it is possible to find state function $x(t)$ and controllability function $u(t)$ of the descriptor systems $Ex'(t) = Bx(t) + Du(t)$ in which E, B, D are real matrices with size equivalent to state function and controllability vector in the type of polynomials of degree $\leq 2p + 1$. The basis of the theory is a method to prove the cascade splitting to transform the original system into an equivalent system in the type $x'_p(t) = \tilde{B}_p \tilde{x}_p(t) + \tilde{D}_p \tilde{z}_p(t)$. In the final step, we obtain function $\tilde{x}_p(t)$ satisfying the condition and substituting this in the previous step. Hence continuing this process, we can find out the functions $x(t)$ and $u(t)$ of the initial descriptor system.

Key words: Descriptor systems; Controllability function; State function; Polynomial; Differential algebraic equations.