

CONTROLLABILITY AND GRAMIANS OF 2D CONTINUOUS TIME LINEAR SYSTEMS*

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Dedicated to Dr. Vasile Drãgan on the occasion of his 70th anniversary

Abstract

The controllability of a class of 2D linear time varying continuous time control systems is studied. The state space representation is provided and the formulas of the states and the input-output map of these systems are derived. The fundamental concepts of controllability and reachability are analysed and suitable controllability and reachability Gramians are constructed to characterize the controllable and the reachable time varying systems. In the case of time invariant 2D systems, some algorithms are developed to calculate different controllability Gramians as solutions of adequate Lyapunov type equations. Corresponding Matlab programs are implemented to solve these Lyapunov equations.

MSC: 93B05, 93C35, 93C05, 93B25

keywords: controllability, Gramians, 2D systems, linear continuous time systems, Lyapunov type equations.

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