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Saturated switching systems

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Abstrak

Saturated switching systems treats the problem of actuator saturation, inherent in all dynamical systems by using two approaches: positive invariance in which the controller is designed to work within a region of non-saturating linear behaviour and saturation technique which allows saturation but guarantees asymptotic stability. The results obtained are extended from the linear systems in which they were first developed to switching systems with uncertainties, 2D switching systems, switching systems with Markovian jumping and switching systems of the Takagi-Sugeno type. The text represents a thoroughly referenced distillation of results obtained in this field during the last decade. The selected tool for analysis and design of stabilizing controllers is based on multiple Lyapunov functions and linear matrix inequalities. All the results are illustrated with numerical examples and figures many of them being modelled using MATLAB®.