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ROBUST GLOBAL EXPONENTIAL STABILITY OF LINEAR IMPULSIVE SYSTEMS WITH TIME-VARYING DELAY AND UNCERTAINTY

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ABSTRACT. This paper studies linear impulsive systems with varying time-delay and uncertainty. By using the method of Lyapunov functions and matrix inequalities, robust global exponential stability criteria are established in terms of fairly simple algebraic conditions. Estimate of the decay rate of the solutions of such systems are also derived. Some examples are given to illustrate the main results.

1. Introduction. Many real world systems display both continuous and discrete characteristics. For example, evolutionary processes such as biological neural networks, bursting rhythm models in pathology, optimal control models in economics, frequency-modulated signal processing systems and flying object motions, etc., are characterized by abrupt changes of states at certain time instants. Those sudden and sharp changes are often of very short duration and are thus assumed to occur instantaneously in the form of impulses. Such impulses may be represented by discrete maps. Systems undergoing abrupt changes may not be well described by using purely continuous or purely discrete models. However, they can be appropriately modeled by impulsive systems. It is now recognized that the theory of impulsive systems provides a natural framework for mathematical modeling of many real world phenomena. Significant progress has been made in the theory of impulsive systems in recent years, see [**1, 4, 5, 7–11**] and references therein. However, the corresponding theory for impulsive systems with uncertainty has not been fully developed. Recently, some robust stability results for impulsive systems with uncertainty have been established in

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