

## ON THE LYAPUNOV STABILITY THEORY FOR IMPULSIVE DYNAMICAL SYSTEMS

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ABSTRACT. In this work, we establish necessary and sufficient conditions for the uniform and orbital stability of a special class of sets on impulsive dynamical systems. The results are achieved by means of Lyapunov functions.

### 1. Introduction

Impulsive systems describe phenomena where the continuous development of a process is interrupted by abrupt changes of state. It is already known that the study of impulsive dynamical systems is very challenging, especially when the impulses occur on the phase space and not in time. Many real world problems are described by impulsive systems. The reader may consult [1], [2], [8], [9], [11], [12], [14]–[16], [18] for more details about the theory of impulsive systems and some applications.

Qualitative properties of solutions as “asymptotic behavior” and “stability of sets” are very important in the study of trajectories on dynamical systems. Although there are many works of stability on impulsive dynamical systems, some questions concerning attraction and stability still lack answers. For instance, let  $(X, \pi; M, I)$  be an impulsive system and  $A \subset X$  be a nonempty set. There

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