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## PERIODIC SOLUTIONS OF SUPERLINEAR AND SUBLINEAR STATE-DEPENDENT DISCONTINUOUS DIFFERENTIAL EQUATIONS

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ABSTRACT. A classical, second-order differential equation is considered with state-dependent impulses at both the position and its derivative. This means that the instants of impulsive effects depend on the solutions and they are not fixed beforehand, making the study of this problem more difficult and interesting from the real applications point of view. The existence of periodic solutions follows from a transformation of the problem into a planar system followed by a study of the Poincaré map and the use of some fixed point theorems in the plane. Some examples are presented to illustrate the main results.

## 1. Introduction

Some evolution processes are subject to sudden changes in their state at certain moments of time. This leads to impulsive differential equations. They arise in many areas of science as basic models in the study of this type of problems.

These differential equations with impulses describe different phenomena undergoing rapid changes on short time intervals. Changes on these intervals are assumed to be instantaneous since their length is negligible in comparison with

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