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EXISTENCE RESULTS FOR SECOND-ORDER BOUNDARY-VALUE PROBLEMS INVOLVING LIPSCHITZ NONLINEARITY WITH SMALL PERTURBATIONS OF IMPULSES

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Abstract. In the present article, we study the Sturm-Liouville boundary-value problem for second-order impulsive differential equations, depending on two real parameters and a Lipschitz nonlinearity order of $p-1$. By applying an approach via variational methods, existence results are obtained.

Keywords. Dirichlet boundary condition; impulsive effects; variational methods; critical points

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1 Introduction

Impulsive differential equations arising in real world phenomena describe the dynamics of processes in which sudden, discontinuous jumps occur. These processes are subject to short term perturbations whose duration is negligible in comparison with duration of the process. In fact, it is known, for example, that many biological phenomena involving thresholds, optimal control models in economics, pharmacokinetics and frequency modulated systems, do exhibit impulse effects. The theory of impulsive differential equations has been emerging as an important area of investigation in recent years [3, 13]. In the last few years some researchers have used variational methods and critical point theory to study the existence of solutions for impulsive boundary value problems [5, 6, 15, 21, 24, 18, 17, 12, 19, 23, 8]. Also Liu and Yan [14] have used variational methods to investigate the solutions of damped impulsive differential equations with mixed boundary conditions. Meanwhile,