

APPLICATION OF THE  
MONOTONE-ITERATIVE TECHNIQUES  
OF V. LAKSHMIKANTHAM FOR SOLVING  
THE INITIAL VALUE PROBLEM FOR  
IMPULSIVE DIFFERENTIAL-DIFFERENCE EQUATIONS

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ABSTRACT. In this paper a monotone-iterative technique is applied to the construction of extremal solutions of the initial value problem for an impulsive system of differential-difference equations.

**1. Introduction.** Impulsive differential equations find a wide application in the mathematical simulation of various phenomena and processes in the theory of optimal control, chemical technology, shock theory, impulse technology, population dynamics, etc., which during their evolution are subject to short-time perturbations. The presence of impulses in the system of differential equations affects essentially the character of the solutions and obstructs significantly the solving of the representative equations in quadratures. This requires the justification of effective methods for their approximate solution. One of these methods is based on the idea of combining the monotone-iterative method and the method of upper and lower solutions and has been justified by V. Lakshmikantham and his disciples for initial value and periodic problems for some classes of differential equations [1, 3–10].

In the present paper the monotone-iterative techniques of V. Lakshmikantham are applied to the approximate solution of the initial value problem for impulsive differential-difference equations.

We shall note that the question of approximate finding of a periodic solution of an impulsive differential-difference equation by means of another monotone method has been considered in [2].

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