OSCILLATION OF NONLINEAR IMPULSIVE
PARABOLIC DIFFERENTIAL EQUATIONS
OF NEUTRAL TYPE

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ABSTRACT. In this paper, oscillatory properties of solutions for certain nonlinear impulsive parabolic partial differential equation of neutral type are investigated and a series of new sufficient conditions and a necessary and sufficient condition for oscillation of the equations are established.

1. Introduction. The theory of delay partial differential equations can be applied to many fields, such as to biology, population growth, engineering, generic repression, control theory and climate model. In the last few years, the fundamental theory of partial differential equations with deviating argument has undergone intensive development. The qualitative theory of this class of equations, however, is still in an initial stage of development. A few papers have been published on oscillation theory of partial differential equations with delay. Many have been done under the assumption that the state variables and system parameters change continuously. However, one may easily visualize situations in nature where abrupt change such as shock and disasters may occur. These phenomena are short-time perturbations whose duration is negligible in comparison with the duration of the whole evolution process. Consequently, it is natural to assume, in modeling these problems, that these perturbations act instantaneously, that is, in the form of impulses. In 1991, the first paper [8] on this class of equations was published. But, for instance, on oscillation theory of impulsive partial differential equations only a few of papers have been published. Recently, Bainov, Minchev, Luo and Liu [3, 4, 7, 18, 20, 22] investigated the oscillation of solutions of impulsive partial differential