Dynamics of Continuous, Discrete and Impulsive Systems
Series **A:** *Mathematical Analysis* **12 (2005)** 67-76

OSCILLATION PROBLEMS FOR DELAY PARABOLIC SYSTEMS WITH IMPULESES[1)]

Baotong Cui[a,b], F.Q. Deng[c], W.N. Li[a] and Y.Q. Liu[c]

a. Department of Mathematics, Shanghai Jiaotong University, Shanghai 200030, P.R.China. E–mail: btcui@sohu.com
b. Research Center of Control Science and Engineering, Southern Yangtze University, Wuxi, Jiangsu 214125, P.R.China
c. College of Automation Science and Engineering, South China University of Technology, Guangzhou 510641, P.R. China.

Abstract. The present paper is devoted to the investigation of the oscillatory properties of delay parabolic systems with impulses. Some criteria are established for oscillation of the solutions of Robin boundary problems of delay parabolic differential systems with impulses.
Keywords. Parabolic differential system; Impulse; Delay; Oscillation.
AMS (MOS) subject classification: 35B05, 34A37

1 Introduction

Recently, we note that the oscillation theory for impulsive partial differential systems [1, 2, 6] and non-impulsive partial differential systems with deviating arguments [3, 4, 5] and the existence results of solutions of the initial-boundary value problems and comparison theorems for impulsive partial differential systems with delay [7, 8] have been studied extensively for the past few years. But there is a scarcity in the study of oscillation theory of impulsive parabolic differential systems with several delays.

Up to now, only Deng and Ge [9] have studied the oscillation of solutions for impulsive delay parabolic systems. The present paper is devoted to the investigation of the oscillatory problems of delay parabolic systems with impulses. Some criteria are established and several necessary and sufficient conditions are obtained for oscillation of the solutions of Robin boundary problems of delay parabolic systems with impulses.

In this paper, we consider the impulsive parabolic system with several delays of the form

$$u_t(x,t) = a(t)\Delta u(x,t) + \sum_{i=1}^{m} b_i(t)\Delta u(x,t-\sigma_i) - p(x,t)u(x,t)$$

[0]1) Supported by the National Natural Science Foundation of China (No. 10371072) and the Natural Science Foundation of Guangdong Province, China (No. 011629).