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Instability of nonautonomous state-dependent delay integro-differential systems

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Abstract

In this paper, we apply the concept of (h, k) dichotomies to obtain the sufficient conditions for instability of the null solution to an integro-differential system with state-dependent delay.
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1. Introduction

State-dependent time delay often occurs in engineering systems, medicine, hydrodynamics, laser physics, chemistry, etc. Since the existence of state-dependent time delay usually causes instability of the systems, the study of state-dependent time delay systems has received considerable attention in the recent years especially in internet congestion, congestive heart failure in humans, traffic congestion in automated highway, mobile networking, population growth, etc. The stability of the nonautonomous delay systems has been extensively studied in literature [3–8], whereas the results on unstable properties of the solution of delay systems are fewer in comparison [11,12]. Thus, there is a need to look into the instability criteria of the delay systems. The idea of dichotomies [2,9,10,13–18] is

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