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CHAOS AND STABILIZATION OF SELF-REMISSION TUMOR SYSTEM BY SLIDING MODE

M.R. JAFARI[1], M.R. ZARRABI[1,2], S. EFFATI[1,3]

Abstract. *In this paper a pray-predator system that called self-remission tumor is considered, and a new approach in order to stabilizing the unstable equilibrium points of self-remission tumor system with sliding mode control is introduced.*

The stability analysis of the biologically feasible equilibrium points is presented by using the Lyapunov function.

A Lyapunov function is supposed for designing a sliding surface (SS).

Lyapunov function is constructed to establish the global asymptotic stability of the uninfected and infected steady states by describing sliding surface (SS), after that by considering the derivation of SS as zero, someone can achieve the equivalent control that inbreed system stays on SS and tends to equilibrium point in infinite horizon.

In addition, numerical examples are presented to illustrate the effectiveness of the proposed method.

Keywords: Chaos, Tumor, Equivalent control, Sliding surface

1. Introduction

Cancer is one of the greatest killers in the world and the control of tumor growth requires special attention [9].

The mathematical modeling of cancer self-remission and tumor has been approached by a few numbers of researchers under using a variety of models over the past decades [8, 9, 13, 18].

Many authors have discussed the problem of the chaotic behavior and stability analysis of some biological models such as cancer and tumor model, genital herpes epidemic, stochastic lattice gas prey-predator modes [7, 8, 13] and many other models.

[1]Department of Applied Mathematics, Ferdowsi University of Mashhad (*see above picture*), Mashhad, Iran, (mreza.jafari26@gmail.com).
[2](mo.za870@gmail.com).
[3](s-effati@um.ac.ir).