STABILITY ANALYSIS IN A MODEL FOR STEM-LIKE HEMATOPOIETIC CELLS DYNAMICS IN LEUKEMIA UNDER TREATMENT *

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Abstract

A one dimensional delay differential equation modeling leukemia under treatment is investigated to decide over the stability of equilibria and existence of Hopf bifurcations. All three types of stem cell division (asymmetric division, symmetric renewal and symmetric differentiation) are considered. The effect of drug resistance is considered through the Goldie-Coldman law.

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1   Introduction

The population of cells whose evolution is modeled in the paper consists of stem cells and progenitors that preserve the capacity of self-renewal. The model is adapted from the Mackey-Glass model where, besides differentiation and self-renewal, asymmetric division is included. Thus, a percentage η_1 of population is supposed to undergo asymmetric division: one daughter cell proceeds to differentiation and maturation while the other one re-enters