Numerical integration of an age-structured hematopoiesis mathematical model

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The hematopoiesis is the process by which the population of blood cells is produced and regulated. it is based upon a succession of complex differentiation of stem cells. These different differentiations, occurring in the bone marrow, are mainly regulated by the total population of the hematopoietic cells. This process sometimes exhibits abnormalities in blood cells production, causing the so-called dynamical hematological diseases. A severe hematological disease is Chronic Myelogenous Leukemia (CML), a cancer of white blood cells. In some cases, Chronic Myelogenous Leukemia eshibits periodic oscillations in all blood cell counts.

In this work, we present a model of hematopoiesis dynamics in which the resting cells come from immature cells but proliferating cells come from immature and mature cells. We analyze the asymptotic stability of the steady states and we illustrate them numerically.

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