A mathematical periodic model for the hematopoiesis process with predictable abrupt changes

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Abstract

Hematopoiesis is the process of production, multiplication, regulation and specialization of blood cells in the bone marrow, until they become mature blood cells for release in the circulation bloodstream. By one hand, this is a biological process, thus it is better modeled if the periodicity of the environment is taken into account. On the other hand, some evolutionary systems go through abrupt changes, due to predictable or sudden external phenomena such as drugs administration or radiation. These phenomena are better described by impulsive differential equations.

In this presentation, we explain a mathematical model to describe the hematopoises process taking into account the periodicity of the environment and predictable abrupt changes. Sufficient conditions for the existence and global asymptotic stability of a periodic solution are given.

This is a joint work with Teresa Faria.