

On the stability of a nonlinear maturity structured model of cellular proliferation

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ABSTRACT

We analyse the asymptotic behaviour of a nonlinear mathematical model of cellular proliferation which describes the production of blood cells in the bone marrow. This model takes the form of a system of two maturity structured partial differential equations, with a retardation of the maturation variable and a time delay depending on this maturity. We show that the stability of this system depends strongly on the behaviour of the immature cells population. We obtain conditions for the global stability and the instability of the trivial solution.

Key Words: Nonlinear partial differential equation, Maturity structured model, Blood production system, Delay depending on the maturity, Global stability, Instability.

References

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