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Periodic Solutions and Chaos in a Nonlinear Model for the Delayed Immune Response ASKERY CANABARRO, IRAM GLERIA, MARCELO LYRA, Federal University of Alagoas - Brazil — We model the cellular immune response using a set of non- Newtonian delayed nonlinear differential equations. The production of defense cells is taken to be proportional to the abundance of pathogenic particles in a previous time. We observe that the stationary solution becomes unstable above a critical immune response time τ_c. In the periodic regime, the minimum virus load is substantially reduced with respect to the stationary solution. Further increasing the delay time, the dynamics display a series of bifurcations evolving to a chaotic regime characterized by a set of 2D portraits. Time series data of the immune state of patients look rather irregular, pointing out to the possibility of a chaotic dynamics.

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