
Age-structured Model with Delay for the Study of Schistosomiasis in Niger

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In this paper, an age-structured model with delay applied to Schistosomiasis in the Republic of Niger is studied. First, the model is formulated using delay differential equations. Then, the basic reproduction number is determined. Once this task is completed, the stability of the disease-free equilibrium point is analyzed. The analytical and numerical results obtained show the stability of the disease-free equilibrium point. Subsequently, by substitution, the endemic equilibrium point is determined. Then, its stability is investigated by using the method of Routh Hurwitz. To do this, the dynamic system reflecting the dynamics of the disease is linearized. Then, the characteristic polynomial of the linearized system is determined. A polynomial depending on the incubation time of the disease is obtained. Afterwards, the stability of the equilibrium point depending on the value of the incubation time is discussed. The analytical and numerical results obtained show that the endemic equilibrium point is stable when the time delay is neglected and it is unstable from certain values of the incubation time. It is observed analytically and graphically that a Hopf bifurcation occurs from a certain latency time