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Stability Analysis of Combined Harvested Prey- Predator System Involving Intra-specific Competition with Active Control

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Abstract: In this article, we propose and study a three dimensional continuous time prey-predator model where the predator is exposed to the risk of disease with Holling type II functional response and we introduced combined harvesting to all the populations. The model consists of prey, susceptible predator and infected predator. We assumed that the infected predator do not predate the prey species. In this work we establish the local asymptotic stability of various equilibrium points to understand the dynamics of the model and also the global stability of the positive equilibrium solution are discussed by constructing a suitable Lyapunov function. Also the active feedback controls are introduced in this model and analysed. Finally, numerical simulations are given to illustrate the analytical results with the help of different sets of parameters.
Keywords: Prey-predator, Combined Harvesting, Global stability, Lyapunov function.

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