The Lotka-Volterra Predator-Prey Models with Harvesting Strategies

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Abstract:

In this talk we discuss the predator-prey models with harvesting of the prey. We briefly introduce the basic Lotka-Volterra predator-prey model and different harvesting strategies. Then we focus on two types of harvesting functions, and combine them with two types of predator-prey models, one with exponential growth of the prey and the other one with logistic growth of the prey. For each type of system, we find the equilibrium points, study the local and global behavior of the solutions of the system, and analyze the change of the predator and prey population due to the effect of the harvesting term added to the differential equation system. The numerical approximations are performed in Matlab using a Runge-Kutta-Fehlberg method. The Dormand-Prince coefficients are used for the stepwise control of the Runge-Kutta-Fehlberg method. We present some results, with comparison among different systems.