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The stability of Gauss model; having harvested factor. (English) Zbl 1272.93123

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Summary: Scientists are interesting to find out “how to use living resources without damaging the ecosystem at the same time”. Since the living resources are limited therefore above question is one of important problems that mathematician scientists try to investigate and in appropriate ways to solve this problem. Regarding to the harvested rate is used as control parameters and moreover, the study of harvested population dynamics is more realistic. In the present paper, some predator-prey Gauss models in which two ecologically interacting species are harvested independently with constant or variable rates are considered and the behavior of locally and globally stability of their solutions is investigated. The main aim is to present a mathematical analysis for the above model. Finally we investigate some examples.

MSC:

93E12 Identification in stochastic control theory

93A30 Mathematical modelling of systems (MSC2010)

37B35 Gradient-like and recurrent behavior; isolated (locally maximal) invariant sets; attractors, repellers for topological dynamical systems

93B18 Linearizations

65H10 Numerical computation of solutions to systems of equations

92D40 Ecology

49N75 Pursuit and evasion games

Keywords:

Gauss model; growth rate model; harvested factor; linearization; Lotka-Volterra models; predator-prey models