

Singular Stochastic Control Model with Carrying Capacity of Population Management Policy for Squirrels in Durian Orchards

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Abstract : In this work, the problem that squirrels ruin durian, which is an economical fruit in Thailand, is considered. We seek the strategy for the durian farmers to eliminate the squirrels under the consideration that squirrels also provide ecosystem service. The population dynamics of squirrels are constructed to have carrying capacity since we consider the population in a confined area. A performance index indicating the total benefit of a given elimination strategy is provided. It comprises the cost of countermeasures, the loss of resources, and the ecosystem service provided by squirrels. The optimal performance index is numerically solved through the variational inequality using the finite difference method. The optimal strategy to control the squirrel population is also given numerically.

Keywords : controlled stochastic differential equation, durian, finite difference method, performance index, singular stochastic control model, squirrel

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