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OPTIMAL STRATEGY OF FISHING PROBLEM ON HERMAPHRODITE POPULATION

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Abstract

In this paper, we have introduced some economic and biologic aspects of renewable resource exploitation, concentrating primarily on a model of a grouper population in an attempt to explain the biology of these species and the phenomenon of grouper fishery. We also developed an optimization model to predict the population dynamics and to identify the features of optimal strategies for fishing activities. Our goal is to study a structured model and to associate it with the maximization of a total discounted net revenues derived from the resource exploitation. We have determined the optimal scenario of the fishing problem by using the tools of the control theory, in particular, the maximum principle. An important result is that reduction in fishing effort would have increased the value of the fishery.

Keywords and phrases: optimal control, fishing effort, Stock, protogynous hermaphrodite, grouper.

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