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BIONOMIC ANALYSIS OF A MODIFIED LESLIE - GOWER MODEL WITH HOLLING TYPE - IV FUNCTIONAL RESPONSE AND HOLLING TYPE - II PREDATOR HARVESTING WITH TIME DELAY

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The dynamic behaviour of a Leslie-Gower model with a Holling type-IV function response and nonlinear predator harvesting was examined in this study. The maturation delay refers to the predators' ability to harvest prey once they reach a certain age. Qualitative analysis, bifurcation theory, bionomic equilibrium, MSY, and the best harvesting policy have all been used to study the model system. We provide an explanation for the delay-dependent and locally persistent asymptotic nature of the interior equilibrium. Regarding the maturation delay, the age-selective harvesting system experiences a Hopf-bifurcation. A unique control's path has been determined using Pontryagin's maximal principle after environments for the MSY and the existence of bionomic equilibrium have been examined.