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A predator-prey model with delay in both the prey and the predator growth terms

A predator-prey model with a discrete delay in both the prey and predator growth terms is formulated and analyzed. Delay is incorporated so that only those that survive the delay period, consistent with the decline terms in the model, can contribute to growth. The model without delay allows only convergence to a globally asymptotically stable equilibrium. Using delay in the predator growth term as a bifurcation parameter can result in complex dynamics, including a period doubling route to chaos followed by period halving, and eventual extinction of the predator population. Delay in the growth term of the prey on the other hand is shown to tame the dynamics.