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Title : Stochastic optimal impulse control policy for management of seasonal fish-eating bird population dynamics

A stochastic differential equation model for population dynamics of a fish-eating bird is presented. Then, an optimal impulse control problem of cost-effective management of the bird population is formulated. This model considers seasonal variation of the growth rate of the bird and has time-dependent coefficients. According to the dynamic programming principle, the most cost-effective management policy of the bird population is found from a Hamilton-Jacobi-Bellman Quasi-Variational Inequality (HJBQVI): a non-local degenerate parabolic partial differential equation. The optimal management policy is then numerically obtained by solving the HJBQVI, and behavior of the resulting controlled population dynamics is analyzed from a statistical viewpoint.