

The optimal harvesting policy for the Beverton–Holt population model

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In this paper, we establish the exploitation of a single population modeled by the Beverton–Holt difference equation with periodic coefficients, recently studied in [1]. We begin our investigation with the harvesting of a single autonomous population with logistic growth and show that the harvested logistic equation with periodic coefficients has a unique positive periodic solution which globally attracts all its solutions. Further, we approach the investigation of the optimal harvesting policy that maximizes the annual-sustainable yield in an elementary way which is different to the classical analysis applied in [2]. In the second part of the paper, we formulate the harvested Beverton–Holt population model and derive the unique periodic solution, which globally attracts all its solutions. We continue our investigation by optimizing the annual-sustainable yield with respect to the harvest effort to obtain the optimal harvesting policy. The results differ from the optimal harvesting policy for the continuous logistic model, which suggests a separate strategy for populations modeled by the Beverton–Holt difference equation.

[1] Bohner, M., Streipert, S., The Beverton–Holt equation with periodic growth rate, *Int. J. Math. Comput.* (2014). To appear.

[2] Fan, M., Wang, K., Optimal harvesting policy for single population with periodic coefficients, *Math. Biosci.* 152, 2 (1998), 165–177.