Risk sensitivity in Beverton–Holt fishery with multiplicative harvest

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We establish a risk assessment framework for exploited populations following the Beverton–Holt recurrence, which is widely applied in the assessment of a species biomass. The underlying motivation is the discussion of the effects in the uncertainty of the parameter values, such as the growth rate. More specifically, we are interested in the probability that the population falls below a critical threshold given a certain probability distribution for the growth rate. First, the Beverton–Holt equation with multiplicative harvest and constant coefficients is considered. Under the assumption of a uniformly distributed growth rate and execution of optimal harvest, we derive the risk of the population entering an undesired value range. This type of risk assessment is then extended to the Beverton–Holt recurrence with two periodic carrying capacity, representing seasonal changes in the environment.

References

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