

POPULATION GROWTH IN A RANDOM ENVIRONMENT: HOW WRONG ARE APPROXIMATE MODELS?

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ABSTRACT

We consider stochastic differential equations to model the growth of a population in a randomly varying environment. These growth models are usually based on classical deterministic models, such as the logistic or the Gompertz model, taken as approximate models of the "true" (usually unknown) growth rate. We study the effect of the gap between the approximate and the "true" model on the qualitative behaviour and on the quantitative behaviour (probability distribution, mean and variance, model predictions) of population size. We also study (see [1]) the effect on the mean and the variance of the time to extinction of the population, based on expressions obtained in [2].

Acknowledgements

Both researchers belong to the Centro de Investigação em Matemática e Aplicações, Universidade de Évora, a research centre supported by FCT (Fundação para a Ciência e a Tecnologia, Portugal).

References

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