A Comparison of Deterministic and Stochastic Population Dynamics in a Model of Food Webs

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Abstract

We present the early results of a fully stochastic ecological model. The inspiration for this model has come from the *WebWorld*[1] model which utilizes a stochastic mechanism for speciation along with continuous and deterministic population dynamics. The model presented here is Markovian and can be written down in terms of chemical reactions. In construcing the present model, we have maintained the *WebWorld* population dynamics as the limiting system behaviour as populations tend to infinity. The formulation presented is not unique although it does have the most natural justification in terms of individual behaviour. We have run both the continuous and discrete models in the case of an assembled community chosen from a large coevolved species pool which has been built up using the continuous model. The results are compared with quantitative topological measures such as species diversity.

References

[1] C Quince, P.G. Higgs, and A.J. McKane. Topological structure and interaction strengths in model food webs. *Ecological Modelling*, 187(4):389–412, May 2005.