

An approximating solution for the stochastic Ridler-Rowe process

M. López García

Martín López García (martin_lopez@mat.ucm.es)
Complutense University of Madrid

Abstract. Stochastic competition processes [1, 2] have been frequently used in biology to describe the dynamics of population models involving some kind of interaction among various species, being the two-species competition interaction one of the most important between them. Our interest is in a two-species competition process termed *Ridler-Rowe process* [3], for which it is known from [2] that the extinction of one or other of the species is certain and that the expectation of the time at which this species becomes extinct is finite. Ridler-Rowe [3] proposed an approximating method for the distribution of the size of the surviving species, that specially works for large initial population sizes. Based in truncating procedures, we propose here an alternative approximation that works when the initial population sizes are small or even moderate. We analyze the accuracy of our solution and compare it with the solution presented by Ridler-Rowe with reference to simulated data.

References

- [1] Iglehart, DL. Multivariate competition processes. *The Annals of Mathematical Statistics* **35** (1964), 350–361.
- [2] Reuter, GEH. Competition processes. *In: Neyman J (ed) Proceedings of the fourth Berkeley symposium on mathematical statistics and probability, volume II: contributions to probability theory* (1961), 421–430.
- [3] Ridler-Rowe, CJ. On competition between two species. *Journal of Applied Probability* **15** (1978), 457–465.