

Mean time to extinction for discrete-time  
population dynamics  
(離散時間的な個体群動態における平均絶滅  
時間)

Shizuoka University, Kazunori Sato (静岡大学, 佐藤一憲)

We propose the procedure to obtain the discrete-time Markov processes corresponding to the discrete-time deterministic population dynamics models. The motivation of our study comes from the present state that the only few papers deal with it while the continuous-time Markov processes corresponding to the continuous-time deterministic ones have been well studied in various literatures from fundamentals to applications [1]. Our idea is based on the so-called “first principles of population dynamics”, which can derive population dynamics models in terms of the spatial distribution and the reproduction for each individual [2]. We obtain the result for the discrete-time Markov process corresponding to Ricker model that the mean extinction time is not always longer for larger initial population size.

## References

- [1] Allen, L. J. S. & Allen, E. J. (2003). A comparison of three different stochastic population models with regard to persistence time. *Theoret. Popul. Biol.* **64**: 439–449.
- [2] Brännström, Å. & Sumpter, D. J. T. (2005). The role of competition and clustering in population dynamics. *Proc. R. Soc. B* **272**: 2065–2072.