Parameter Estimation of Lotka-Volterra Model : A Two-Step Model

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ABSTRACT
The deterministic power law logistic model is used to describe density-dependent population growth for cases when ordinary logistic model is found to be insufficient. This paper estimates the parameters of stochastic power law logistic model specifically the Lotka-Volterra model by employing the two-step approach. The Bayesian approach is implemented in the first step of estimating the regression spline parameters. Combining the existing and proposed nonparametric criterion, the structural parameters of SDE are estimated in the second step. Results indicate high percentage of accuracy of the estimated diffusion parameter of Lotka-Volterra model supporting the adequacy of the proposed criterion as an alternative to the classical methods.

KEYWORDS: Stochastic differential equation; regression spline; Bayesian approach; truncated power series basis; Lotka-Volterra model

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