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ABSTRACT | Flávio Coelho

Title

A Bayesian Framework for Parameter Estimation in Dynamical Models with Applications to Forecasting

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Abstract

Mathematical models in Biology are powerful tools for the study and exploration of complex dynamics. Nevertheless, bringing theoretical results to an agreement with experimental observations involves acknowledging a great deal of uncertainty intrinsic to our theoretical representation of a real system. Proper handling of such uncertainties, is key to the successful usage of models to predict experimental or field observations. This problem has been addressed over the years by many tools for model calibration an parameter estimation. In this presentation we present a general framework for uncertainty analysis and parameter estimation which is designed to handle uncertainties associated with the modelling of dynamic biological systems while remaining agnostic as to the type of model used. We apply the framework to two Influenza transmission models: one deterministic and the other stochastic. The results show that the framework can be applied without modifications to the two types of models and that it performs equally well on both. We also discuss the application of the framework to calibrate models for forecasting purposes.