Suggested readings for breakout session on statistical and computational challenges posed by partially observed compartmental models

July, 2017

Overview

Compartmental models describe dynamics of populations, where individuals can be assigned types, but individuals are allowed to switch types as time goes by. We will review statistical challenges that arise when analyzing such models and will highlight how different research communities proposed to tackle these challenges. The main focus will be describing statistics of compartmental models under realistically complicated observation schemes with noisy observations and large fractions of missing data.

Suggested readings

1. R Chen and O Hyrien. Quasi- and pseudo-maximum likelihood estimators for discretely observed continuous-time Markov branching processes. Journal of Statistical Planning and Inference, 141:2209–2227, 2011.

2. V. Dukic, H.F. Lopes, and N.G. Polson. Tracking epidemics with Google flu trends data and a state-space SEIR model. Journal of the American Statistical Association, 107:1410–1426, 2012.

3. P. Fearnhead, V. Giagos, and C. Sherlock. Inference for reaction networks using the linear noise approximation. Biometrics, 70:457–466, 2014.

4. E.L. Ionides, D. Nguyen, Y. Atchade, S. Stoev, and A.A. King. Inference for dynamic and latent variable models via iterated, perturbed Bayes maps. Proceedings of the National Academy of Sciences of the USA 112:719-724, 2015.

5. E Lakatos, A Ale, PDW Kirk, and MPH Stumpf. Multivariate moment closure techniques for stochastic kinetic models. The Journal of Chemical Physics, 143, 094107, 2015.

6. J Liepe, P Kirk, S Filippi, T Toni, CP Barnes, and MPH Stumpf. A framework for parameter estimation and model selection from experimental data in systems biology using approximate Bayesian computation. Nature Protocols, 9:439–456, 2014.

If you would like to suggest additional readings, contact Vladimir Minin.