

Colloquium

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Friday, September 14, 2012 at 3 pm in Bell Hall 143

Statistical computational approaches for applications in bioinformatics and systems biology

1. Gaussian process regression bootstrapping:

To be discussed is a parametric bootstrapping approach for time course data, in which Gaussian process regression is used to fit a probabilistic model from which replicates may then be drawn. This approach implicitly allows the time-dependence of the data to be taken into account, and is applicable to a wide range of problems. Generally this method fall in application of Gaussian Processes for Machine Learning, more information is available in a book: <http://gaussianprocess.org/gpml/>

2. Fisher Information Matrices for stochastic chemical kinetics models:

Second method to be presented numerically calculates Fisher Information Matrices for stochastic chemical kinetics models. The linear noise approximation is used to derive model equations and a likelihood function which leads to an efficient computational algorithm. This methodology is then used to study sensitivity and robustness in stochastic chemical kinetics models. We show that significant differences exist between stochastic and deterministic models as well as between stochastic models with time-series and time-point measurements. This approach can be used in the analysis and design of experiments probing stochastic processes at the cellular level. More information is available here: <http://www.theosysbio.bio.ic.ac.uk/resources/stns/>