The Second YUIMA Conference

March 22 - 25, 2019

The Department of Statistical Science
Sapienza University of Rome

Statistical simulations of a discretely observed stochastic partial differential equation

Masahiro Uchida (Osaka University)

Simulations of a numerical solution of a parabolic linear second order stochastic partial differential equation (SPDE) by using R language are investigated. Based on discrete observations obtained from a sample path of the SPDE, we consider asymptotic performance of the estimators proposed in Bibinger and Trabs (2017, arxiv:1710.03519v1) of the normalized volatility parameter and the curvature parameter, and adaptive estimators of the coefficient parameters in the SPDE. This is a joint work with Yusuke Kaino.

Improvement of the functions for statistical inference in YUIMA package

Shoichi Eguchi (Center for Mathematical Modelling and Data Science, Osaka University)

In yuima package, there are several functions for statistical inference of stochastic differential equations, which includes "qmle" for parameter estimation and "IC" for model selection. However, these functions still have room for improvements. In this talk, we will explain the specifications of qmle and IC and propose the improvements of these functions.

Inference for the fractional Ornstein-Uhlenbeck in Yuima

Alexandre Brouste (University of Maine)

A survey of inference in statistical experiments implying the fractional Onrstein-Uhlenbeck (fOU) will be carried out. Past, present and future of the statistical tools in the Yuima package concerning the fOU will be presented.

Numerical issues on the estimation of Point Process Regression Models

Lorenzo Mercuri (University of Milan)

Diffusion process models on the torus and related statistical methodology are presented. The aim is to use the diffusion models as part of a model for the evolution of proteins, and eventually the We discuss some numerical issues that arise when we consider different types of interaction among covariates, counting and intensity processes used in the formal definition of Point Process Regression Models. We start from the simple case where in the dynamics of the intensity only the covariates enter in the feedback structure with no common parameters. In this case the estimation procedure involves two distinct optimization problems: the qmle associated to the data regarding covariates and the qmle associated to the counting process. We also consider the case where the covariates, the counting and the intensity processes evolve simultaneously with the presence of shared parameters. In the latter case, the joint likelihood function can be written as the summation of the likelihoods of the covariates with that of the counting processes. We conclude by con sidering some filters for the estimation of the distribution of the jump size in the counting process.

Discussion of machine learning methodologies for Bayesian estimation in Yuima

Kengo Kamatani (Osaka University)

I will talk about some theories of deterministic piecewise Markov processes and technical difficulties for implementing in the Yuima package. I will also discuss other machine learning techniques that might have the advantage to implement in the Yuima package.

Asymptotic expansion revisited: toward reconstruction of the asymptotic term

Nakahiro Yoshida (University of Tokyo)

The asymptotic expansion scheme for option pricing was proposed in [2] as a by-product of applications of the Malliavin calculus to statistics in [1]. YUIMA has asymptotic term to compute the second-order asymptotic expansion of the expectation of an irregular function of a general functional of the solution of a stochastic differential equation. In this talk, we discuss a generalization of the asymptotic expansion formula and some computational aspects to carry out the scheme.

1. N. Yoshida:"Asymptotic expansions of maximum likelihood estimators for small diffusions via the theory of Malliavin-Watanabe," Probability Theory and Related Fields, 92, (1992) 275–311

2. N. Yoshida: "Asymptotic expansion for statistics related to small diffusions," J. Japan Statist. Soc. 22, (1992) 139–159

RblDataLicense: R Interface to 'Bloomberg Data License'

Emanuele Guidotti (Partner with Algo Finance Sagl., CEO Founder of WhatsOut Srl)

Data License is the technology that delivers Bloomberg's data content sets, providing reference, pricing and regulatory data across enterprises and feeding accounting, portfolio management and compliance systems with over 50 million securities and more than 15 thousand fields.

The 'RblDataLicense' package aims at providing an easy interface to download prices and market data with the Bloomberg Datalicense service, without the need to set up any working Bloomberg installation (as required by the 'Rblpapi' package for Bloomberg Terminal users). As a prerequisite, a valid Data License from Bloomberg is needed together with the corresponding SFTP credentials and whitelisting of the IP from which accessing the service. Data retrieval in yuimaGUI could be extended and support the Bloomberg Datalicense provider. Such a possibility will be discussed. The package is being developed on GitHub and should be available on CRAN soon. This software and its author are in no way affiliated, endorsed, or approved by Bloomberg or any of its affiliates. Bloomberg is a registered trademark.

High-dimensional covariance estimation in YUIMA package

Yuta Koike (University of Tokyo)

First, we overview recent developments in high-dimensional covariance estimation of a semimartingale model based on high-frequency data. Next we discuss how we implement such methods in the framework of YUIMA.

On some use of yuima.Law class

Hiroki Masuda (Kyushu University)

I would like to discuss about some use of yuima.Law class, which is done through the random variable constructor 'setLaw,' along with briefly reviewing background theory. Also given will be a few suggestions about incorporation of some existing packages available at CRAN.

Jump detection on YUIMA package

Yuma Uehara (The Institute of Statistical Mathematics)

In this talk, we briefly introduce two jump detection methods: the one is based on Jarque- Bera normality test and the other one is based on rank statistics. After that, we explain the functions under development which execute these methods on YUIMA package.

An overview on penalized estimators for sparse SDEs

Alexandre De Gregorio (Sapienza University of Rome)

In this talk we present the recent developments concerning the penalized estimation problems for sparse stochastic differential equations. For the application of these statistical tools to stochastic processes the introduction of new Yuima functions is required.