Simulation and Inference for Stochastic Differential Equations in R with Applications to Finance

Stefano Iacus*

Dipartimento di economia, management e metodi quantitativi
Università degli Studi di Milano
R Core Team

Syllabus del corso

The course plan to cover the following topics:

- Simulation of solutions of stochastic differential equations.
- Quasi–maximum likelihood estimation.
- Model selection.
- Analysis of financial time series.
- Clustering of financial time series.
- Change point analysis for the volatility in stochastic differential equations.

Students are required to have basic knowledge of the R statistical package and come with a pre–installed version of the software on their machines. Software is available here http://www.r-project.org. The additional Yuima package should be installed from the R console with the command

```
install.packages("yuima", repos = "http://r-forge.r-project.org")
```

or, if it fails, with

```
install.packages("yuima", repos = "http://r-forge.r-project.org", type ="source")
```

Preliminary notions on SDEs are welcome.

Lectures will be based on the following books:

- Iacus, S.M. (2011). *Option Pricing and Estimation of Financial Models with R*. John Wiley & Sons, Ltd., Chichester, 472 page, ISBN: 978-0-470-74584-7.
- Iacus, S.M. (2008). *Simulation and Inference for Stochastic Differential Equations: with R examples*. Springer Series in Statistics, Springer NY, 300 pages, ISBN: 978-0-387-75838-1.

but extract of the parts relevant to the course, will be distributed during the lectures along with exercise sheets.

---

*url: http://www.facoltaspes.unimi.it/Facolta/Personale/DocentiRicercatori/IACUS-STEFANOMARIA-01J_ITA_HTML.html