

**Summer School of Mathematics for Economics and Social Sciences**

16 - 20 September 2013

The **“Summer School of Mathematics for Economics and Social Sciences”** aims to improve the knowledge of mathematical methods among graduate students in economics and social sciences, with a focus on those techniques which albeit widespread in use are not properly covered in typical graduate programs. The School is an interdisciplinary venue intended to foster the interaction of people coming from the too often separated communities of mathematical and social scientists. It is organized by the *Mathematics Research Center “Ennio De Giorgi*” and supported by the *International Doctoral Program in Economics of the Scuola Superiore Sant'Anna*.

**Dates:** from 16 to 20 September2013

**Venue:** Conservatorio di Santa Chiara, San Miniato, Italy

**Topics:** Information theory, chaos and ergodicity with application to data analysis

**Lecturer**: Stefano Marmi, Scuola Normale Superiore, Pisa

Fabrizio Lillo, Scuola Normale Superiore, Pisa

**Participation**

The participation is subject to a selection. Only 20-25 positions are available. Financial support for board and accommodation will be provided.

On-line applications should be made at <http://crm.sns.it/event/276/financial.html>

All applications must include a CV that shall be sent by e-mail to [crm@crm.sns.it](mailto:crm@crm.sns.it). Applications without a CV will not be considered.

Deadline for the application: **2 August 2013.**

Decision on the application will be communicated: **9 August 2013**.

**Scientific Committee**

Giulio Bottazzi (Scuola Superiore Sant'Anna), Giorgio Fagiolo (Scuola Superiore Sant'Anna), Davide Fiaschi (Università di Pisa), Stefano Marmi (Scuola Normale Superiore)

**Syllabus of the course**

* Information theory and Shannon entropy
* Symbolization of time-series and of dynamical systems
* Ergodicity
* Invariant measures arising from time series and entropy computation
* Entropic measures in data analysis
* Transfer entropy, redundancy and n-gram entropy in symbolic series
* Kullback-Leibler distance for multivariate series
* Maximum entropy principle for ensembles and networks
* Applications in Economics and Finance

**Topics considered prerequisite for the course**

Basic notions of probability, statistics and dynamical systems. A working knowledge of some high-level programming language (e.g. mathematica, matlab, octave, R, etc.) will be useful for some assignments.

**Course timetable and teaching load**

*From Monday to Thursday*

9:00-12:00 main lecture

14:00-15.30 exercises with the teacher

15.30-17:00 individual exercises

*Friday*

9:00-12:00 main lecture

14:00-16:00 final exam

Up to date information about the program of the

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can be found at <http://crm.sns.it/event/276/>