MATH MINI-COURSE

MARKOVIAN PROBABILITY

TIME & VENUE

11:00-12:15, Thursdays, October 18 - November 29, 2018
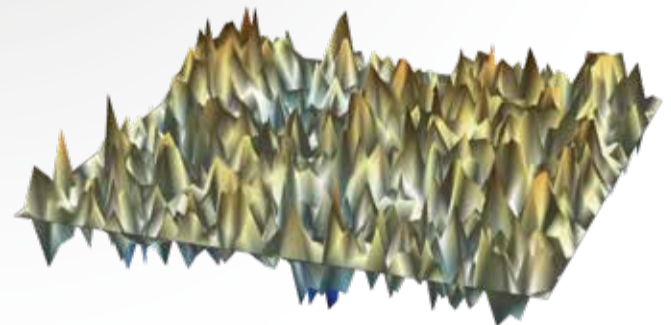Room 304, NYU Shanghai, 1555 Century Avenue, Pudong New Area, Shanghai

Notes: There is no course scheduled on November 1 and November 22. And the venue for the course on October 25 is Room 311.

SPEAKER

YVES LE JAN

UNIVERSITÉ PARIS-SUD & NYU SHANGHAI
Senior Member of the Institut Universitaire de France

ABSTRACT

Although Markov processes such as random walks or Brownian motion have been ubiquitous in all kinds of stochastic models for many decades, their importance in the study of other processes notably the models of statistical physics became recently more obvious.

We describe the emergence of a mathematical scenery in which Markovian constructions play a fundamental role, where a variety of processes are fundamentally connected: Loop ensembles, random spanning trees, configuration models, networks, flows and maps are part of this picture and relations with the physical field theory are in the background.

The course will present several aspects of the theory. Here is a (tentative) list:

1. Weighted graphs, Markov chains and loop measures.
2. Loop erasure and spanning trees.
3. The Gaussian free field. Bosons and Fermions.
4. Networks, configurations and maps.
5. Loop topology and Gauge fields.
6. Brownian loops and renormalization.

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