MATH-531

Introduction to random geometry

Cursus	Sem.	Type
Ing.-math	MA2, MA4	Opt.
Mathématicien	MA2	Opt.

Language of teaching	English
Credits	5
Session	Summer
Semester	Spring
Exam	During the semester
Workload	150h
Weeks	14
Hours	**4 weekly**
Courses	2 weekly
Exercises	2 weekly
Number of positions	

Remark

Pas donné en 2026-27

Summary

We will discuss and study several models of random geometry - these are probabilistic models of random curves, surfaces, metrics often stemming from statistical physics and or field theories.

Content

We will consider different models of random geometry, both continuous and discrete. Some possible models include:
- random walk / Brownian motion
- loop soups
- Schramm-Loewner evolution
- Gaussian free field
- planar maps / Gaussian multiplicative chaos
- gauge theories
- etc...

The exact models will be chosen organically during the course.

Keywords

Random Geometry, Brownian motion, Schramm Loewner Evolution, Gaussian free field, Gaussian multiplicative chaos

Learning Prerequisites

Required courses

Measure-theory based probability theory
Good basic understanding of complex analysis

Assessment methods

Oral presentation during the semester

Resources

Moodle Link

- https://go.epfl.ch/MATH-531