Random walks and random media

ECTS : 6

Volume horaire : 30

Description du contenu de l'enseignement :

- **Random walks in random environment** are random processes obtained after launching a Markovian walker on **Z**d equipped with a random field of transition probabilities. We will review classical results (recurrence / transience, LLN, Sinai regime, Kesten Kozlov Spitzer regime) in dimension d=1 where the behaviour of the walk is well understood but also study the difficult multidimensional case d>=2 where even simple questions (as LLN) remains open.
- **Potential theory and electrical networks**: the analogy with electrical networks gives a physical insight as well as a robust method for proving recurrence or transience of reversible random walks on the Euclidean lattice or more general graphs.
- **Random interlacement**, introduced by Sznitman in the early 2010, may be seen as a « soup » of random walk paths. It plays an decisive role both as a limit object for many random walk models and also as a tractable long range correlated random field.

Compétence à acquérir :

Understand and apply the fundamental definitions, results and proofs of the course.