

PROBABILITY 2



Composante
UFR de
mathématiques
et
informatique
(UFR27)



**Volume
horaire**
42h



**Période de
l'année**
Printemps

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Description

Objectifs: Martingales and Markov chains in discrete time

Prerequisite: Probability with measure: σ -fields, measure space, measurable maps. Non-negative measures, integration of real valued functions. Convergence of sequences of real valued maps. Monotone convergence, Fatou lemma, dominated convergence (Lebesgue). L_p spaces. Probability measure. Random variables. Expectations of r.v. Independence of sub- σ -fields, independence of random variables.

Contenu du cours:

1. Conditional expectation, definition, properties
2. Discrete time processes, filtration, stopping time, Sigma-field of events determined prior to a stopping time
3. Discrete time Martingales, stopped martingales, optional sampling theorem, maximal inequalities, convergence of martingales, regular martingales
4. Markov chains with countable states, conditional independence, Markov property, Markov sequences, transition matrix. Markov chains, communication classes, recurrence and transience, positive states, null states, invariant measures, ergodic properties

References

1. Jacques Neveu: Bases Mathématiques de la théorie des probabilités
2. Jacques Neveu: Martingales en temps discret
3. Lacroix, P. Priouret, Cours: J. Lacroix, Probabilités approfondies, Université Pierre et Marie Curie, Master de Mathématiques, 2005-2006
4. Jean Jacod, Chaînes de Markov, Processus de Poisson et Applications, Université Pierre et Marie Curie, DEA de Probabilités et Applications, 2003-2004