

MASTER Economics Mathematics for finance

Contacts	Description	Information
Laurent BRUASSE laurent.bruasse@univ-amu.fr	Part of course.	http://formations.univ-amu.fr
Mathieu FAURE mathieu.faure@univ-amu.fr	Code: PA-ME5BEC-BECBV3C Domain: Law, Economics, Management	Department: Faculty of Economics and Management <i>Last modification: 05/09/2018</i>

CONTENT

Objectives :

Introducing elementary tools to analyse discrete and continuous-time random processes.

Roadmap :

1. Markov chains
 - 1.1. Introductory Example : random walks
 - 1.2. Markov chains on a finite state space
 - 1.3. Markov chains on countable state spaces
 - 1.3.1. States classification
 - 1.3.2. Asymptotic results
2. Markovian processes in continuous time
 - 2.1. Poisson processes
 - 2.2. Continuous-time Markov processes
 - 2.3. Queueing theory
3. Discrete-time random processes
 - 3.1. Conditional expectation
 - 3.2. Martingales
 - 3.3. Stopping time
 - 3.4. Convergence theorems
 - 3.5. Applications
4. Introduction to continuous-time stochastic processes : Brownian motion

PROFESSIONAL SKILLS

- Being able to model simple situations with random processes

- Analysing asymptotic behavior of simple random processes

BIBLIOGRAPHY

- Stochastic Processes, S.R.S. Varadhan, AMS 2007 vol 16
- Promenade aléatoire, Chaines de Markov et simulations ; martingales et stratégies, M. Benaïm, N. El Karoui, Ed de l'école polytechnique

ORGANISATION

- Lectures 24h
- Exam mid-term + final exam

FUNDAMENTAL PREREQUISITES

Basic notions in probability theory.

VOLUME OF TEACHINGS

- Lectures: 24 hours

TRAININGS

Master's degree: Economics

- Empirical and theoretical economics
- Economic policy analysis
- Econometrics, big data, statistics
- Quantitative finance and insurance

