Stochastic Processes

MH 3512

Introduction
This lecture

1. Who am I?

2. Schedule & Teaching method

3. Learning subjects & resources

4. Semester Dates

5. Indicative assessment

6. Questions
Background

- **Since 2019:** Nanyang Assistant Professor at NTU
- **06.2015-12.2018:** Postdoc in Financial and Insurance Mathematics at ETH Zurich
- **02.2012-05.2015:** PhD in Mathematics, ETH Zurich (Columbia U.)
  
  **Supervisors:** Prof. Marcel Nutz (Columbia University),
  Prof. Martin Schweizer (ETH Zurich)

  **Thesis title:** Knightian Uncertainty in Mathematical Finance

- **10.2006-10.2011:** Bachelor and Master in Mathematics at ETH
Research interests:

- Machine Learning Algorithms in Finance and Insurance
- Model Uncertainty in Financial Markets
- Financial and Insurance Mathematics
- Stochastic Analysis & Stochastic Optimal Control
- Cybersecurity for insurance
- Green Finance
Schedule & Teaching Method

Lecture: Online (Recorded videos on NTULearn available)

We shall have lectures followed by exercises after each chapter, whose solutions are available in the lecture notes.

Remark: If there is an exercise you would like me to explain more in detail, please send me an email and I can explain it to you and/or make a video for everyone available.

Knowledge requirement: MH2500 (Introduction course to probability)

Help (repetition of MH2500): Chapter 1 of lecture notes

Recommendation: Solve as many exercises as possible
**Tutorial/Repetition (voluntary):**

- Friday 10:30-11:30 at SPMS-LT1,
- or Friday 11:30-12:30 at SPMS-LT1

- 20-30 minutes repetition of this week’s topic, followed by
- 20-30 minutes of question times

- Maximum 49 students per tutorial class (safe distancing measures)
- May register each week online via doodle link I’ll send you per email

**Remark:** If one student does not get a spot in one of the two tutorial classes, please send me an email
Learning subjects & resources

- Part 0: Introduction
- Part I: Gambling Problems (1 week)
- Part II: Random Walks (1 week)
- Part III: Discrete-time Markov Chains (1 week)
- Part IV: First Step Analysis (1 week)
- Part V: Classification of States (1 week)
- Part VI: Long-Run Behavior of Markov Chains (1 week)
- Part VII: Discrete-Time Martingales (1 week)
- Part VIII: Branching Processes (1 week)
- Part IX: Continuous-time Markov Chains (2 weeks)

**Lecture notes** will be available on NTULearn and on my webpage:

www.ntu.edu.sg/home/ariel.neufeld

**Consult** and **discuss** with your class mates

My **email** address: ariel.neufeld@ntu.edu.sg
Indicative assessment

1. Homework: 50%
   
   Remark: Everyone is required to solve it him/herself

2. Final exam: 50%
   - 2 hours
   - Closed book (= no notes)

Date & time: TBA
If you have any questions, please feel free to contact me per email or in person during tutorial class on Friday.