Mathematical Statistics

MAS 713

Introduction
This lecture

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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
- Green Finance
Who are you?

Who are you?
Schedule

1. **Lecture:** Friday 14:00-18:00 at MAS Exec Room 2
Teaching method

1. We shall have a lecture followed by a tutorial
2. No designated tutorials
3. Many examples throughout the lectures
4. No homework assignments, only recommended exercises
Learning subjects

- Part 0: Introduction
- Part I: Descriptive statistics
- Part II: Elements of Probability
- Part III: Random variables
- Part IV: Confidence interval
- Part V: Point Estimation
- Part VI: Maximum Likelihood Estimation
- Part VII: Bayesian Inference
- Part VIII: Hypothesis Testing
- Part IX: Regression
- Revision
Learning outcomes

Upon successful completion of the requirements for this course, students should have the knowledge and skills to:

1. Demonstrate an understanding of probability theory
2. Demonstrate knowledge of, and properties of, statistical models in common use
3. Understand the basic principles underlying statistical inference (estimation and hypothesis testing)
4. Be able to construct tests and estimators, and derive their properties
5. Understand the difference between Frequentist and Bayesian approaches
Learning resources

1. **Slides** will be available online via NTULearn and my homepage.
2. **Book:** *Statistical Inference, 2nd Ed,* by George Casella and Roger L. Berger, 2001 (You can find it using google)
3. **Consult** and **discuss** with your class mates
4. My **email** address: ariel.neufeld@ntu.edu.sg
Semester Dates

SINGAPORE PUBLIC HOLIDAYS (JUL 2019 - MAY 2020)

- National Day: 9 Aug 2019 (Fri)
- Hari Raya Haji: 11 Aug 2019 (Sun)
- Deepavali: 27 Oct 2019 (Sun)
- Christmas Day: 25 Dec 2019 (Wed)
- New Year’s Day: 1 Jan 2020 (Wed)
- Chinese New Year: 25 - 26 Jan 2020 (Sat - Sun)
- Good Friday: 10 Apr 2020 (Fri)
- Labour Day: 1 May 2020 (Fri)
- Vesak Day: 7 May 2020 (Thu)
- Hari Raya Puasa: 24 May 2020 (Sun)

Public holiday dates falling between Jul 2019 and May 2020 are marked in red on the calendar.
Indicative assessment

1. Mid term exam: 50%  
   - 2-3 hours  
   - Closed book
   
   Date: Friday 13. March (from 14:00, in the classroom)

2. Final exam: 50%  
   - 3 hours  
   - Closed book
   
   Date: TBA
Questions?