Mathematical Statistics

MAS 713

Introduction
This lecture

1. Who am I?
2. Who are you?
3. Schedule
4. Teaching method
5. Learning subjects
6. Learning outcomes
7. Learning resources
8. Semester Dates
9. Indicative assessment
10. 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
- Annuity Contracts
- Financial and Insurance Mathematics
- Stochastic Analysis & Stochastic Optimal Control
Who are you?
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 on blackboard (online)

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 classmates

4. My **email** address: ariel.neufeld@ntu.edu.sg
**SEMESTER 2**

**2019**

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<tr>
<th>JANUARY</th>
<th>FEBRUARY</th>
<th>MARCH</th>
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**SINGAPORE PUBLIC HOLIDAYS (JUL 2018 - MAY 2019)**

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<th>Public Holiday</th>
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<td>Hari Raya Haji</td>
<td>22 Aug 2018 (Wed)</td>
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<td>Deepavali</td>
<td>6 Nov 2018 (Tue)</td>
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<td>Christmas Day</td>
<td>25 Dec 2018 (Tue)</td>
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<td>New Year’s Day</td>
<td>1 Jan 2019 (Tue)</td>
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<td>Chinese New Year</td>
<td>5 - 6 Feb 2019 (Tue - Wed)</td>
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<td>Good Friday</td>
<td>19 Apr 2019 (Fri)</td>
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<td>Labour Day</td>
<td>1 May 2019 (Wed)</td>
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<td>Vesak Day</td>
<td>19 May 2019 (Sun)</td>
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<td>Hari Raya Puasa</td>
<td>5 Jun 2019 (Wed)</td>
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Public holiday dates falling between Jul 2018 and Jun 2019 are marked in red on the calendar.

Note: Classes will proceed normally on the immediate Monday following a public holiday on Saturday. For a public holiday which falls on Sunday, the following Monday will be a replacement holiday.
Indicative assessment

1. Mid term exam: 50%  
   - 90 min (or 120 min)  
   - Closed book

   **Date:** Friday 15. March (14:00-16:00, in the classroom)

2. Final exam: 50%  
   - 3 hours  
   - Closed book

   **Date:** Friday, 3. May, 09:00-12:00 (location TBA)
Questions?