Probability

Syllabus

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Contents

Syllabus

1. Basics of Probability
   - Sets Theory
   - Probabilities and counting rules
   - Conditional probability and independence
   - Bayes theorem
2. Discrete Random variables
   - Definition and Probability Density Functions (PDFs)
   - Expected Value
   - Binomial Distribution
   - Poisson distribution
   - Cumulative Distribution Functions (CDFs)
3. Continuous Random variables
   - Probability Density Functions (PDFs) and Cumulative Distribution Functions (CDFs)
   - Expected Value
   - Uniform Distribution
   - Normal distribution

Syllabus

4. Joint distributions
   - Joint distributions (discrete and continuous)
   - Marginal and conditional probability
   - Independence
5. Sampling
   - Law of large numbers
   - Central Limit theorem
6. Estimation methods and properties
   - Estimators, bias, and consistency
   - Constructing estimators

Evaluation

Your grade will be computed as:

- Mid-term exam (40%)
- Final exam (60%)

10 sessions of 3h: half coursework half practical sessions
Attendance is mandatory (more than 3 unjustified absences = zero)

References

The course is entirely based on

- Wackerly, D., Mendenhall, W., & Scheaffer, R. L. (2014). Mathematical statistics with applications. Cengage Learning.

Some inspiration comes from

- Konrad Menzel's MIT course