Suggested Practice Problems in Textbook (120A)

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Tips for Using This Study Guide

1. This guide is designed to provide extra practice problems with the topics listed below, helping you strengthen your understanding and prepare for exams.
2. Refer to the weekly lecture topics and choose the relevant practice problems from the list below.
3. After each session, solutions to selected problems will be posted. The problems chosen will align with the topics discussed in class. For instance, solutions to **Conditional Probability** problems will be available after the Week 4 session.

Introduction

1. Basic statistics: 1.2
2. Set theory and axioms of probability: $1.13, 1.14, B.1, B.5(a)$
3. Counting methods: $1.7, 1.8, 1.26$

Conditional Probability

1. Conditional probability: $2.2, 2.7$
2. Law of total probability: 2.6
3. Bayes Formula: $2.33, 2.37, 2.40$
4. Independence: $2.13, 2.17$
5. Conditional independence: 2.27, Example 2.38

Random Variables

1. Discrete random variables: $3.5, 2.38$
2. Continuous random variables: $3.7, 3.25$

Distributions for Discrete Random Variables

1. Binomial distribution: $2.21, 2.62$
2. Geometric distribution: $2.20, 2.22$
3. Negative binomial distribution: Example 7.7
4. Hyper-geometric distribution: $2.24, 2.28$
5. Poisson distribution: $4.10, 4.33, 4.34$
   Remark. The mean of Poisson random variable is the parameter λ.

Distributions for Continuous Random Variables

1. Uniform distribution: $1.9, 1.11, 3.4, 3.20, 3.41$
2. Exponential distribution: $4.13, 4.14$
3. Normal distribution: $3.17, 3.18a, 3.18b$

Expectations

1. Expected value: $3.30, 3.32, 3.37$
2. Variance: $3.15, 3.31$
3. Moment generating functions: $5.13, 5.15$
4. Transformation of random variables: $5.7, 5.8$

Combined Section on Special Distributions and Expectations

See exercises $3.18c, 4.49, 3.51 - 52, 5.12, 5.16, 5.24$

Joint Distributions

1. Discrete case: $6.2, 6.19$
2. Continuous case: $6.5, 6.35$
3. Independence: $6.27, 6.32, 7.3$
4. Expectation: $8.4, 8.7, 8.11, 8.9$
5. Covariance: $8.14, 8.16, 8.17$

Combined Section on Special Distributions and Joint Distributions

See exercises $6.6, 6.11, 6.12, 7.5, 8.15$

Conditional Distributions

See exercise $10.2, 10.6, 10.8$

Note: This study guide is used for Botao Jin's sections only. Comments, bug reports: b_jin@ucsb.edu