

Topics for Exam 3**1. Special Distributions**

- 1.1 Discrete distributions: Bernoulli, Binomial, Geometric, Hypergeometric, (Discrete) Uniform and Poisson.
- 1.2 Continuous distributions: Uniform, Exponential, Normal, Chi-Square, and t -distribution.

2. Limiting Distributions

- 2.1 The Poisson distribution as a limit of binomial distributions.
- 2.2 Convergence in distribution
- 2.3 mgf Convergence Theorem

3. Limit Theorems

- 3.1 Chebyshev Inequality
- 3.2 Convergence in probability
- 3.3 The Law of Large Numbers
- 3.4 Random samples: Sample Mean and Sample Variance
- 3.5 The Central Limit Theorem
- 3.6 Applications of the Central Limit Theorem: Point Estimates and Confidence Intervals.

Relevant sections in the text: 3.5, 3.6, 5.6, 5.4, 6.3, 4.8, 5.2 and 7.2

Relevant chapters in the lecture notes: Chapters 6, 7 and 8.

Important Concepts

Independent identically distributed (iid) random variable, convergence in distribution, convergence in probability, limiting distribution, the Central Limit Theorem, the weak Law of Large Numbers, random samples, point estimate, interval estimate, unbiased estimator, consistent estimator.

Important Skills

Know how to use independence; know how to apply the mgf convergence theorem to compute limiting distributions; know how to apply the Central Limit Theorem; know how to apply the Chebyshev's inequality and the weak Law of Large Numbers; know how to obtain point and interval estimates for the mean of a distribution.