

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

- 1.1. Joint distribution of two random variables
- 1.2. Marginal distributions
- 1.3. Independent random variables

2. Limiting Distributions

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

3. Examples of Random Variables

- 3.1. Discrete random variables: Discrete Uniform, Bernoulli, Binomial, Geometric, Hypergeometric and Poisson.
- 3.2. Continuous random variables: Uniform, Exponential, Normal, Chi-Squared

Relevant Sections in Lecture Notes: 6.1, 6.2, 6.3, 7.1, 7.2, 8.1, 8.2 and 8.3

Relevant sections in the Text: 3.4, 3.5, 3.9, 5.4, 5.6 and 6.3

Relevant assignments: 8, 9 and 10.

Important Concepts

Joint distributions; marginal distributions; independent random variables; independent, identically distributed (iid) random variables; convergence in distribution; the mgf convergence theorem; the central limit theorem.

Important Skills

1. know how to compute the joint cdf and the joint pdf (or pmf) of two random variables.
2. Know how to compute marginal distributions.
3. Know how to compute probabilities based on joint distributions.
4. Know how to use independence.
5. Know how to apply the mgf convergence theorem to compute limiting distributions.
6. Know how to apply the Central Limit Theorem.