

Midterm: September 18th, 2003

1. Exam Instructions:

- (a) The Exam will be closed book. No notes.
- (b) A simple calculator will be allowed.
- (c) Please show your work in the exam, write in complete sentences, and Indicate your answers clearly.
- (d) The exam will have 5 questions and shall be worth 50 points.

2. Preparing for the Midterm:

This is intended as a check-list and it is not meant to be exhaustive.

- (a) You should know the definition/meaning of the following terms/notions:
 - i. Basic notions: Sample space, Probability, Distribution function, Independence, Random variables (discrete and continuous), Random Vectors and Characteristic function.
 - ii. Convergence in Probability/Distribution/a.e, r th mean
 - iii. $o(\cdot)$ and $O(\cdot)$, $o_p(\cdot)$ and $O_p(\cdot)$,
 - iv. Asymptotically Normal
 - v. Consistency (weak, strong)
 - vi. Chebyshev's inequality
 - vii. Information
- (b) You will need to understand and apply the following results:
 - i. Relationship between modes of convergence
 - ii. Central Limit Theorem
 - iii. Weak law of Large numbers
 - iv. Strong law of Large numbers
 - v. Slutsky's Theorem
 - vi. Scheffe's Theorem
 - vii. Cramer-Wold device
 - viii. Cramer's Theorem (including the multivariate case), Variance stabilising transformation.
 - ix. Polya's Theorem
 - x. Borel- Cantelli Lemma
 - xi. Theorems concerning consistency and Asymptotic distribution of
 - A. order statistics.
 - B. quantile.
 - C. MLE.
- (c) You may ignore for this exam:
 - i. the significance of asymptotic relative efficiency
 - ii. Skorokhod's Theorem
 - iii. Problem 10 in Hw2