STATISTICS (Part 1B)

Estimation

Review of distribution and density functions, parametric families. Examples: binomial, Poission, gamma. Sufficiency, minimal Sufficiency, the Rao-Blackwell theorem. Maximum likelihood estimation. Confidence intervals. Use of prior distribution and Bayesian interference.

Hypothesis testing

Simple examples of hypothesis testing, null and alternative hypothesis, critical region, size, power, type I and II errors, Neyman-Pearson Lemma. Significane level of outcome. Uniformly most powerful tests. Likelihood ratio, and use of generalised likelihood ratio to construct test statistics for composite hypothesis. Examples, including t-tests and F-tests. Relationship with confidence intervals. Goodness-of-fit tests and contingency tables.

Linear Models

Derivation and joint - distribution of maximum likelihood estimators, least squares, Gauss - Markov theorem. Testing hyoptheses, geometric interpretation. Examples, including simple linear regression and one-wa analysis of variance (ANOVA).

Appropriate books

D.A Berry and B.W Lindgren Statistics, Theory and Model Wadsworth 1995

G Casella and J.O Berger Statistical Inference Duxbury 2001

M.H DeGroot and M.J Schervish Probability and Statistics. Pearson 2001