

Lectures On Statistics

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Preface

These notes are based on a course that I gave at UIUC in 1996 and again in 1997. No prior knowledge of statistics is assumed. A standard first course in probability is a prerequisite, but the first 8 lectures review results from basic probability that are important in statistics. Some exposure to matrix algebra is needed to cope with the multivariate normal distribution in Lecture 21, and there is a linear algebra review in Lecture 19. Here are the lecture titles:

1. Transformation of Random Variables
2. Jacobians
3. Moment-generating functions
4. Sampling from a normal population
5. The T and F distributions
6. Order statistics
7. The weak law of large numbers
8. The central limit theorem
9. Estimation
10. Confidence intervals
11. More confidence intervals
12. Hypothesis testing
13. Chi-square tests
14. Sufficient statistics
15. Rao-Blackwell theorem
16. Lehmann-Scheffé theorem
17. Complete sufficient statistics for the exponential class
18. Bayes estimates
19. Linear algebra review
20. Correlation
21. The multivariate normal distribution
22. The bivariate normal distribution
23. Cramér-Rao inequality
24. Nonparametric statistics
25. The Wilcoxon test

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