STAT 703/J703
February 22nd, 2007
-Lecture 12-

Instructor: Brian Habing
Department of Statistics
LeConte 203
Telephone: 803-777-3578
E-mail: habing@stat.sc.edu

Today

- Exam 1: E(log(X))
- Neyman-Pearson Lemma Examples

$f(x)=(1/\theta)x^{(1-\theta)/\theta}$ for $0 < x < 1$ where q > 0

Find E(log(X))

Neyman-Pearson Lemma: If the likelihood ratio test that rejects H_0 in favor of H_A when

$$\lambda = \frac{f_0(\underline{x})}{f_A(\underline{x})} \leq c,$$

has significance level α, then any other test having significance level at most α has power less than or equal to the power of the likelihood ratio test. (I.e., the LRT has highest power among tests with significance level α).

In some cases we can also show that the test is uniformly most powerful for a composite alternate hypotheses.

This happens if we can show it is most powerful for *every* simple alternate in H_A.

Consider a sample $X_1, \ldots X_n$ from a gamma distribution with known parameter α and unknown parameter λ.

What is the most powerful test of the hypothesis H_0: $\lambda = 1$ vs. H_A: $\lambda = 2$?

Consider a sample X_1, … X_n from a binomial distribution with known parameter m and unknown parameter p.

What is the most powerful test of the hypothesis H_0: p = .5 vs. H_A: p = .6?