

Stat 609 (Fall 2016)

Homework Assignment 1

Due in lecture on Sept 26, 2016

1.3, 1.13, 1.18, 1.24, 1.33, 1.36, 1.38, 1.46, 1.47, 1.52, 1.54, 2.2, 2.3, 2.6, 2.11, 2.15

Homework Assignment 2

Due in lecture on Oct 10, 2016

2.30, 2.31, 2.34, 2.39, 3.2, 3.13, 3.18, 3.24, 3.25, 3.28, 3.31, 3.33, 3.39, 3.45

Additional problem 1:

Find an example of two random variables X and Y such that X and Y are not independent but their ch.f.'s satisfy $\phi_X(t)\phi_Y(t) = \phi_{X+Y}(t)$ for all $t \in \mathcal{R}$.

Additional problem 2:

Let ϕ_n be the ch.f. of a probability measure P_n , $n = 1, 2, \dots$. Let $\{a_n\}$ be a sequence of nonnegative numbers with $\sum_{n=1}^{\infty} a_n = 1$. Show that $\sum_{n=1}^{\infty} a_n \phi_n$ is a ch.f. and find its corresponding probability measure.

Homework Assignment 3

Due in lecture on Oct 26, 2016

4.1, 4.4, 4.5, 4.6, 4.10, 4.15, 4.16, 4.24, 4.26, 4.28, 4.30, 4.42, 4.48, 4.51, 4.53, 4.58

Homework Assignment 4

Due in lecture on Nov 14, 2016

4.32, 4.34, 4.38, 5.8, 5.10, 5.15, 5.16, 5.19, 5.21, 5.22, 5.23, 5.24, 5.27

Additional problem 1: Apply Cochran's theorem to prove Theorem N3

Additional problem 2:

Let X_1, \dots, X_n be independent and $X_i = N(0, \sigma_i^2)$, $i = 1, \dots, n$. Let $\tilde{X} = \sum_{i=1}^n \sigma_i^{-2} X_i / \sum_{i=1}^n \sigma_i^{-2}$ and $\tilde{S}^2 = \sum_{i=1}^n \sigma_i^{-2} (X_i - \tilde{X})^2$. Apply Cochran's theorem to show that \tilde{X}^2 and \tilde{S}^2 are independent and that \tilde{S}^2 has the chi-square distribution χ_{n-1}^2 .

Homework Assignment 5

Due in lecture on Dec 5, 2016

5.31, 5.32, 5.33, 5.36, 5.38, 5.42, 5.44, 5.49, 5.61

An additional problem:

Let X_1, X_2, \dots be independent random variables such that for $j = 1, 2, \dots$, $P(X_j = \pm j^a) = 6^{-1} j^{-2(a-1)}$ and $P(X_j = 0) = 1 - 3^{-1} j^{-2(a-1)}$, where $a > 1$ is a constant. Show that Lindeberg's condition is satisfied if and only if $a < 1.5$.

Homework Assignment 6

Due in lecture on Dec 16, 2015

6.3, 6.5, 6.9(b),(c), 6.12,6.15, 6.21, 6.22, 6.23, 6.30, 6.36