

18.443. Pset 6.

(1) page 415, No. 7. Find 90% confidence intervals for the mean μ and the variance σ^2 .

(2) page 469 No. 2.

(3) page 469 No. 4.

(4) Consider two hypotheses, null hypothesis H_1 and alternative hypothesis H_2 :

H_1 : the distribution P is Bernoulli with probability of success $p = 0.2$,

H_2 : the distribution P is Bernoulli with probability of success $p = 0.4$.

Given two observations X_1, X_2 construct the most powerful test of size $\alpha_1 = 0.05$. Compute the power of this test.

(5) Suppose that we have ten observations X_1, \dots, X_{10} from a normal distribution for which the mean μ is unknown and the variance σ^2 is 4. Given two simple hypotheses

$$H_1 : \mu = 1, \quad H_2 : \mu = -1$$

find the most powerful test δ with type 1 error $\alpha_1(\delta) = 0.05$. Compute the power of this test.