ECEN321 : Engineering Statistics
Assignment 9 Submission

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June 9, 2020

Hypothesis Tests

1. (Navidi 6.2.18) 98% lower bound = 50.1, $H_0 : \mu \leq 50$, $H_1 : \mu > 50$
   That lower bounds tells us that there is a 2% (0.02) chance of obtaining a sample mean more that 50.1.

   (a) Cannot determine if $P < 0.01$ as we only know that$P < 0.02$.

   (b) As$P < 0.02 < 0.05$ we can determine if $P < 0.05$.

2. (Navidi 6.3.8) $n = 300$, $x = 12$ and $H_0 : p \geq 0.08$, $H_1 : p < 0.08$

$$z = \frac{\hat{p} - p_0}{\sqrt{p_0(1 - p_0)/n}}$$

$$\text{from above} : p_0 = 0.08,\ \hat{p} = x/n = 12/300 = 0.04$$

$$z = \frac{0.04 - 0.08}{\sqrt{0.08(1 - 0.08)/300}} = -2.55377$$

$$P(Z < -2.55) = 0.0054$$

   This is (I think) sufficient evidence to reject the null hypothesis and support the claim of less then 8% defective production.

3. (Navidi 6.4.4)
   Ideal: 23
   Sample: $n = 10$, $\bar{x} = 23.2$, $s = 0.2$

   (a) Null Hypothesis can be that the population mean **is** 23 and the alternate, that it is not.
   $H_0 : \mu = 23$, $H_a : \mu \neq 23$

   Test Statistic: $t = \frac{\bar{x}-\mu}{s/\sqrt{n}} = 0.2/(0.2/\sqrt{10}) = 3.162278$ $df = n - 1 = 9$

   (b) From table with, a df of 9 and a t value of ~ 3.16 the two tailed P value is ~ 0.0115

   (c) As this value represents the probability that the population mean is 23, I think there is sufficient evidence to claim that the process needs recalibration.