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Assignment no 13

Sol 1 Application of t distribution

1. To test significance of significance of a single population mean when variance is known
2. ~~To test population mean~~ sample
2. To test population mean when the
3. Test of Hypothesis about correlation coefficient
4. Test of Hypothesis difference between two mean with different sample.

Sol 2 Here mean of sample.

$$\bar{X} = \frac{70+120+110+101+88+83+95+98+107+100}{5}$$

$$\bar{X} = 97.2.$$

$$s^2 = \frac{\Sigma (x_i - \bar{X})^2}{N-1} = 203.731$$

$$S = 14.273.$$

Now $t_{stats} = \frac{\bar{X} - \mu}{\frac{s}{\sqrt{n}}} = \frac{97.2 - 100}{\frac{14.273}{\sqrt{10}}} = \cancel{-12.63}$ -0.62

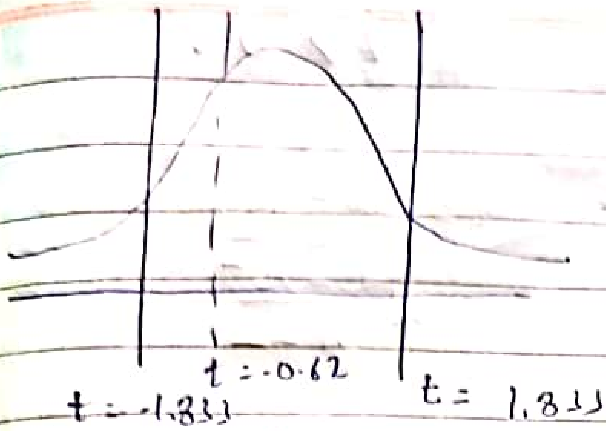
H_0 $\mu = 10$

H_A $\mu \neq 10$

tstatic at 5% signif and 9 degree of freedom

$t = 1.833$ $t = -1.833.$

Since -0.62 lie



So we cannot reject the null hypothesis

So (mean = 100)

(3)

Diet A	Diet B	difference
25	44	+19
32	34	+2
30	22	-8
34	10	-24
24	47	+23
14	40	+26
32	30	-2
24	32	+8
30	35	+5
31	18	-13
35	21	-14
29	25	-4
22	29	+7

S.D =

H_0 $\mu d = 0$

H_A $\mu d \neq 0$

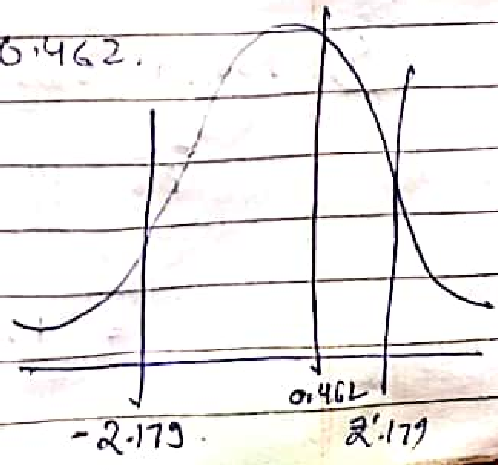
Mean = 1.92 SD = 14.958

~~SD = 4.147~~

$$t = \frac{1.92 - 0}{\frac{S.D}{\sqrt{n}}} = \frac{1.92 - 0}{\frac{14.944}{\sqrt{13}}} = 0.462.$$

Now tstatic = 2.179

Cannot reject the null hypothesis there is no differ



(4) $r = 0.6$ $H_0 : \rho = 0$ $H_A : \rho \neq 0$

$$t = r\sqrt{\frac{n-2}{1-r^2}} = 0.6 \times \sqrt{\frac{27-2}{1-0.6^2}} = 0.6 \times \sqrt{\frac{25}{0.64}}$$

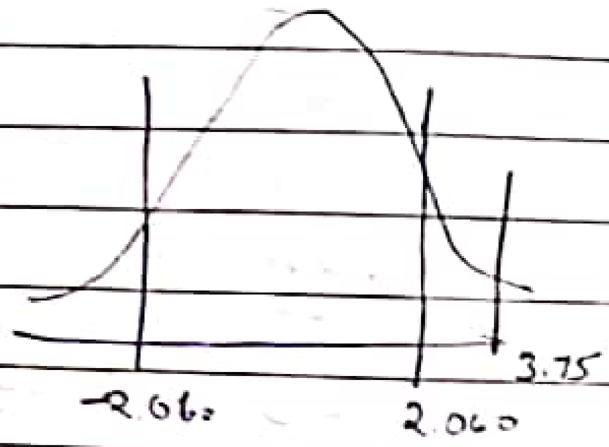
$$= \frac{0.6}{0.8} \times 5 = \frac{5 \times 3}{4} = \frac{15}{4} = 3.75$$

Now at df = $n-2$ = 25

t static = 2.060 Now

at 0.025.

$t_{\frac{\alpha}{2}, n-2}$



~~Failed t stat.~~

~~Hypothesis failed to reject the null hypothesis.~~

We reject the null hypothesis and there is significant correlation between the variable

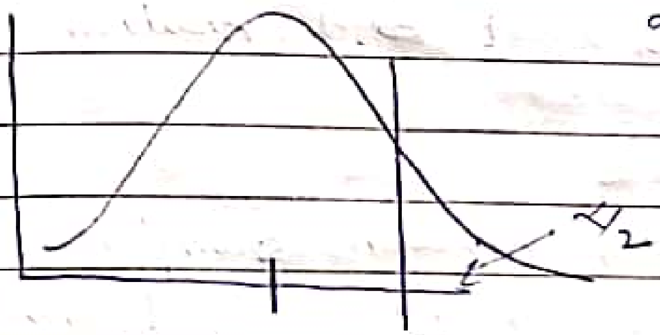
(5) $H_0: \sigma_1^2 = \sigma_2^2$ $\quad H_A: \sigma_1^2 \neq \sigma_2^2$

$F = \dfrac{S_1^2/\sigma_1^2}{S_2^2/\sigma_2^2}$ $\quad F = \dfrac{S_1^2}{S_2^2}$

Numerator has (n_1-1) degree of freedom

Denominator has (n_2-1) degree of freedom

~~Now it is two tailed Test~~



$\alpha/2 = 0.05$

numerator as $(\alpha = 0.10)$ has 10 degree of fr

Denominator has 8 degree of freedom

$F_{static} = 2.56$ $\quad F_{n-1,\, n-1,\, \alpha/2} = 3.35$

$F_{10,\, 8,\, 0.05} = 3.35$

$F_{static} = \dfrac{(0.8)^2}{(0.5)^2} = \left(\dfrac{8}{5}\right)^2 = \dfrac{64}{25} = \boxed{2.56}$

$F_{static} < F_{critical}$

(we cannot reject null hypothesis so the variances are equal)