



(An Autonomous Institution)
Coimbatore— 35

DEPARTMENT OF MATHEMATICS

UNIT-I TESTING OF HYPOTHESIS

DEST OF SIGNIFICENCE OF SMALL BAMPLES!

VARIANCE RATIO TEST (07) F- Test JOR EQUALITY OF YARIAN

Null Thypothesis: Ho: T,2= 022

Test stastics: $F = \frac{8^2}{5^2}$ where $5^2 > 5^2$.

where $S_1^2 = \frac{n_1 s_1^2}{n_{i-1}}$ of $S_1^2 = \frac{5(\alpha_1 - \overline{\lambda_1})^2}{n_{i-1}}$ &

 $\frac{S_2^2 = n_2 S_2^2}{n_2 - 1} \quad \text{of} \quad S_2^2 = \frac{\sum (n_2 - \bar{n}_2)^2}{n_2 - 1}$

Deglee & Freedom, (V, V2)

where 1: (n,-1), 12=(n,-1)

Note 1:- F Greater than zone always.

Note 2: - Suppose S_2^2 Greater than S_1^2 , then $F = \frac{S_2^2}{S_1^2}$ with degree 9 greadom, $V_1 = n_2 - 1$, $V_2 = n_1 - 1$

Thest' is used to test of the two samples have come from the same population.





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) two landom sample g 11 and g items show that the sample standard deviations g their weights as 0.8 & 0.5 neighboring. Assuming that the weight distributions are normal, test the hypothesis that the true variances are equal, against the alternative hypothesis that they are not Sign!
Given · · n, = 11 , 31 = 0.8

n2 = 9 , 82 = 0.5 $B_1^2 = \frac{0.61^2}{0.1-1} = \frac{11(0.8)^2}{11-1} = 0.404$ B2= 1262 = 9(0.5)2=0.2812 step 1 > Formulate Ho & HI. Ho: 5,2=0,2 ower to the popular H1: 52 + 52 stip 2 .- > Los at x = 5 y. slip 3 > Test Statistic, F = 812 = 0.704 = 2.5 stip 4 -> Degrees & Freedom (9,12) (n.-1, n2-1) == Ceincalvalus, Ftab: Fx = 3.35 Step 5 -> conclusion: F=2.5 < 3.35 = Fx :. Ho is accepted at x:5%.





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) Two eardon samples yave the following lexulte: Sample size samplemean sum g squees a deviation from the means. 10 15 90 Yest whether The samples came from the same population. goln! n=12 , x1 = 14 , \((x1-\overline{x}_1)^2 = 108 no = 10, no = 15 & (no - 72)= 90 $S_1^2 = \frac{\mathcal{L}(\eta_1 - \bar{\eta}_1)^2}{0} = \frac{108}{18 - 1} = 9.818$ $S_{2}^{2} = \frac{5(n_{2} - \overline{n}_{2})^{2}}{n_{2-1}} = \frac{90}{10-1} = 10$ 3,2 <5,2 step 1: Formulate Ho and H,: Ho: 5,2 = 5,2 H1: V12 + 022 stip 2: Los at a = 5%.





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critical value, Fx = 2.90

Sty & : Conclusion:

.. Ho is accepted at 5% Los.

(11) 4 - Test:

step 1: Hormulate Ho & Hi.

H1: H1 + MT

olip 2 : Los at 5 / .= x

glip 3: Test Statistic,
$$l = \frac{\bar{x}_1 - \bar{x}_2}{S\sqrt{n_1 + \frac{1}{n_2}}}$$

Here $n_1 = 12$, $n_2 = 10$; $\bar{x}_1 = 14$, $\bar{x}_2 = 15$
Now $S^2 = \frac{\sum (\bar{x}_1 - \bar{x}_1)^2 + \sum (\bar{x}_2 - \bar{x}_2)^2}{n_1 + n_2 - 2}$
 $= \frac{108 + 90}{12 + 10 - 2} = 9.9$
 $S = 3.14$





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$$S_1^2 = \frac{\sum (n_1 - \overline{n}_1)^2}{n_1 - 1} = \frac{11.5}{7} = 5.9286$$

$$S_2^2 = \frac{\sum (n_2 - \overline{n}_2)^2}{n_2 - 1} = \frac{101.7148}{6} = 16.9524$$

$$S_1^2 < S_2^2$$

$$Stip 1: \text{ formulate the 8 Hi:}$$

$$H_0: \ \nabla_1^2 = \nabla_2^2$$

$$H_1: \ \nabla_1^2 \neq S_2^2$$

$$Stip 2: \text{ Los at } S = 1 \text{ H.}$$

$$Stip 3: \text{ Test statistic, } F = \frac{S_2^2}{S_1^2}$$

$$= \frac{16.9524}{5.9286} = 2.86$$

$$Stip 4: \text{ Regrees } q \text{ Freedom:} (v_1, v_2)$$

$$= (n_2 - 1, n_1 - 1)$$

$$= (6, 4)$$

$$Step 5: \text{ Conclusion, } F = 2.86 < 7.19 = Fx$$

$$Ho & accepted at Ho at 1 7.20s.$$