Statistics

Lecture 28

Feb 19-8:47 AM

Optional Study Guide 3

College claims that standard deviation of ages of all students is 8 yrs. $\sigma = 8$ claim

H_0

I took a sample of 10 students, standard deviation of their ages was 5 yrs.

$n = 10$ $s = 5$

NO $\alpha \rightarrow .05$

Test the claim.

H_0: $\sigma = 8$ claim

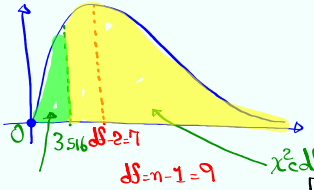
H_1: $\sigma \neq 8$ TTT

P-Value Method

CTS $\chi^2 = \frac{(n-1)\cdot s^2}{\sigma^2}$

$= \frac{(10-1)\cdot 5^2}{8^2}$

$= 3.516$



$df = n-1 = 9$

$\chi^2_{cdf}(3.516, E99, 9) = .940$

$\chi^2_{cdf}(0, 3.516, 9) = .060$

P-Value = 2 · Smaller area = .120

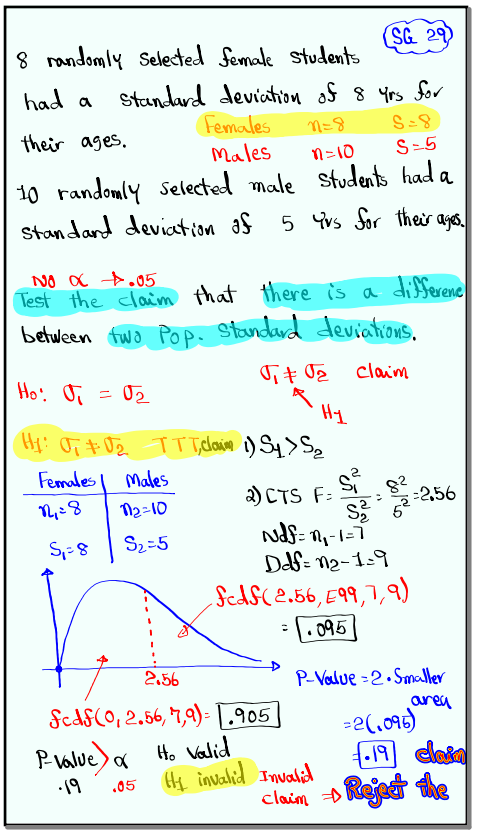
P-Value .120 > α .05

H_0 Valid → Valid claim

H_1 invalid

FTR the claim

Jun 2-1:49 PM



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Now using 2-SampF Test

inpt:

$S_1 = 8$

$n_1 = 8$

$S_2 = 5$

$n_2 = 10$

$\sigma_1 \neq \sigma_2$

Stats

CTS F = 2.56

P-Value p = .190

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Last Topic — Study Guide 33

Comparing at least 3 pop. means:

$H_0: \mu_1 = \mu_2 = \mu_3 = \cdots = \mu_K$

H_1: At least one mean is different. RTT

$K \rightarrow$ # of groups $\Rightarrow$ $NdF = K-1$

$n \rightarrow$ Total Sample size $\Rightarrow$ $DdF = n-K$

Method → ANOVA (Analysis of Variance)

STAT TESTS ↑ ANOVA L1, L2, L3, ...

CTS F

P-Value P

P-Value $> \alpha$ → H_0 Valid, H_1 invalid

P-Value $\leq \alpha$ → H_0 invalid, H_1 Valid

Final Conclusion must be claim

Reject the claim OR FTR the claim

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I randomly selected exams from 3 colleges. Here are the Scores

ELAC	Mt. SAC	Chaffey
75 83 100	73 96 99	84 96 100
90 88 68	86 80	65 75 80
80		

$K = 3$

$n = 7+5+6 = 18$ $\Rightarrow$ $NdF = K-1 = 2$, $DdF = n-K = 15$

ELAC → L1

Mt.SAC → L2

Chaffey → L3

use $\alpha = .1$ to test the claim that all means are equal.

STAT → TESTS → ANOVA(L1, L2, L3)

$H_0: \mu_1 = \mu_2 = \mu_3$ claim

H_1: At least one mean is different. RTT

CTS F = .159

P-Value P = .854 ✓

P-Value $>$ α

.854 $>$ .1

H_0 Valid → Valid claim

H_1 invalid

FTR the claim

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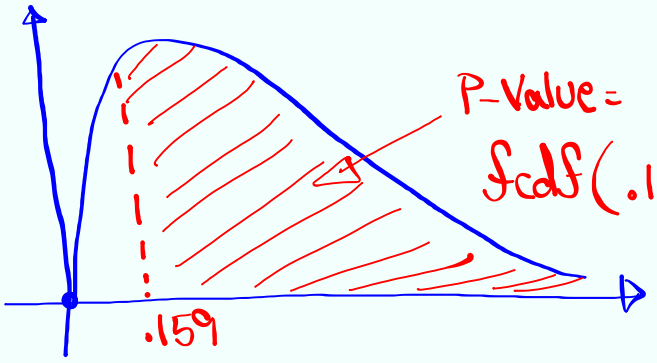
CTS F=.159 Ndf=2 Ddf=15 RTT



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I randomly selected students from 4 schools.
Here are their ages:

ELAC			Mt. SAC			Chaffey			UCLA		
24	28	18	19	29	35	17	23	29	28	33	40
32	25		21	25		29	30		50	35	

k=4 → Ndf=k-1=3
n=20 → Ddf=n-k=16
NO α → .05

Test the claim that not all pop. means are equal.

$H_0: \mu_1=\mu_2=\mu_3=\mu_4$

H_1: At least one mean is different. RTT, claim

ELAC →L1
Mt.SAC →L2
Chaffey →L3
UCLA →L4

ANOVA(L1,L2,L3,L4)
CTS F=3.996
P-Value P=.027 ✓
P-Value ≤ α, H_0 invalid
.027 .05 H_1 Valid

If we choose α to be .02 or .01, then P-Value > α
H_0 Valid
H_1 invalid → Invalid claim Reject

Valid claim
FTR the claim.

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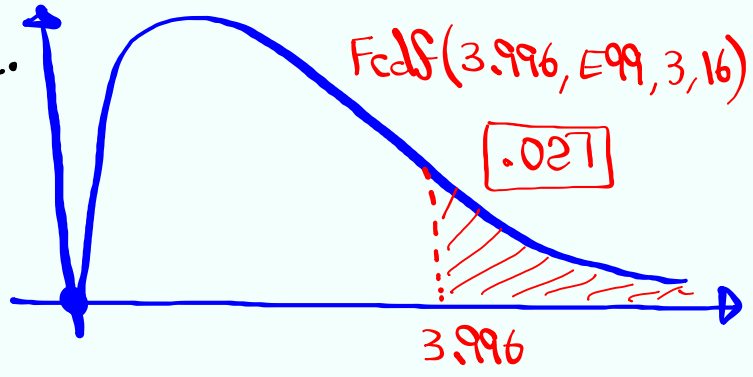
CTS $F=3.996$, $Ndf=3$, $Ddf=16$, RTT

Find P-Value.



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