Math 227
Spring 2021
Lecture 27

SG 32

Comparing Two Population Standard deviations: σ_1 & σ_2

$H_0: \sigma_1 = \sigma_2$

$H_1: \sigma_1 \neq \sigma_2$ TTT

Sample 1	Sample 2
$n_1 =$	$n_2 =$
$S_1 =$	$S_2 =$

$S_1 > S_2$

CTS F =

P-value P =

$\Rightarrow$ 2-SampFTest

CTS $F = \frac{S_1^2}{S_2^2}$

P-value

Proceed with testing chart to draw conclusion about H_0 & H_1

Scds

NdS = $n_1 - 1$

DdS = $n_2 - 1$

Final Conclusion: Reject the claim OR FTR the claim

Given

Sample 1	Sample 2
$n_1 = 8$	$n_2 = 15$
$S_1 = 12$	$S_2 = 5$

Use $\alpha = .02$ to test the claim that $\sigma_1 = \sigma_2$.

H_0: $\sigma_1 = \sigma_2$ claim

H_1: $\sigma_1 \neq \sigma_2$ TTT

Always make sure $S_1 > S_2$

STAT TESTS 2-SampFTest

inpt: Stats

$S_1 = 12$, $n_1 = 8$, $S_2 = 5$, $n_2 = 15$, $\sigma_1 \neq \sigma_2$

CTS $F = \frac{S_1^2}{S_2^2} = \frac{12^2}{5^2} = 5.76$

CTS F = 5.76

P-value P = .005

P-value $\leq \alpha$

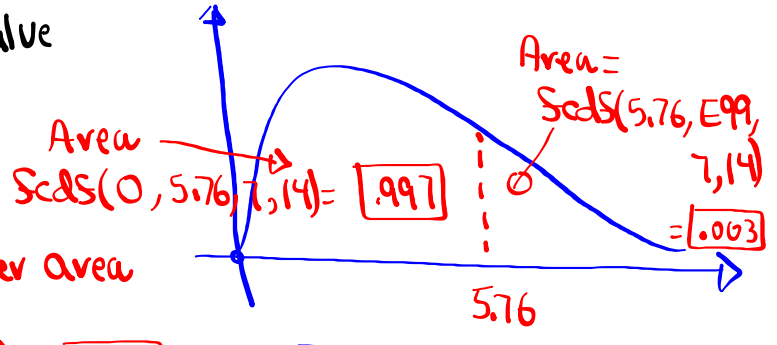
$.005 \leq .02$

H_0 invalid $\Rightarrow$ Invalid claim $\Rightarrow$ Reject the claim

H_1 valid

Given CTS F = 5.76 TTT NdF = 7 DdF = 14

Find P-value



P-value = 2 * Smaller area

$= 2(.003) = .006$

F-Dist

Morning class : $n=8$, $\bar{x}=82$, $S=10$

Afternoon class : $n=12$, $\bar{x}=85$ $S=11$

1) Identify Group 1 & Group 2 So I can compare two Pop. Standard deviation.

Afternoon	Morning
$n_1=12$	$n_2=8$
$S_1=11$	$S_2=10$

$S_1 > S_2$

2) Test the claim that there is no difference between two Pop. Standard deviations.

$H_0: \sigma_1 = \sigma_2$ Claim

$H_1: \sigma_1 \neq \sigma_2$ TTT

CTS $F=1.21$

P-value $P=.828$

$F=\frac{S_1^2}{S_2^2}=\frac{11^2}{10^2}=1.21$

2-Samp FTest

P-value $>$ α
.828 .05

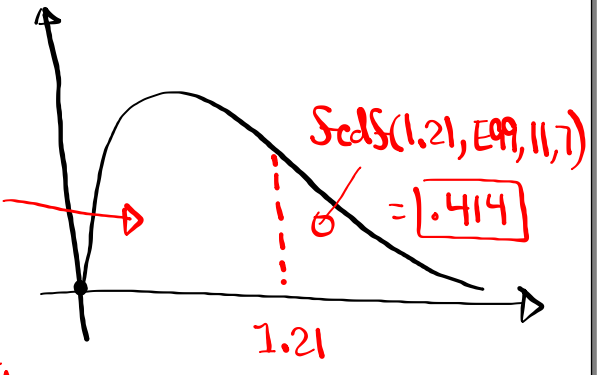
H_0 valid $\Rightarrow$ valid claim $\Rightarrow$ Support the claim

H_1 invalid

FTR the claim

Given CTS $F=1.21$ TTT $Ndf=11$ $Ddf=7$

Find P-value



P-value = 2 * Smaller area

$=2(.414)=.828$

I randomly selected 10 students from ELAC.
Here are the ages:

32	27	18	40	45
21	25	25	30	35

⇒ Find $\bar{x}$ & S. Round to 1-decimal.

$n=10$
$\bar{x}=29.8$ $S=8.4$

I also randomly selected 10 students from Mt.SAC.
Here are their ages:

19	27	34	43	20
25	18	30	46	35

Find $\bar{x}$ & S. Round to 1-decimal

$n=10$
$\bar{x}=29.7$ $S=9.8$

use $\alpha=.1$ to test the claim that two pop. standard deviations are different $\sigma_1 \neq \sigma_2$

$H_0: \sigma_1=\sigma_2$

$H_1: \sigma_1 \neq \sigma_2$ TTT claim

Mt. SAC	ELAC
$n_1=10$	$n_2=10$
$S_1=9.8$	$S_2=8.4$

$S_1 > S_2$

2-Samp FTest
CTS $F=1.361$
P-value $P=.653$

P-value $>$ α ⇒ H_0 valid
.653 .1

H_1 invalid ⇒ Invalid claim

Reject the claim

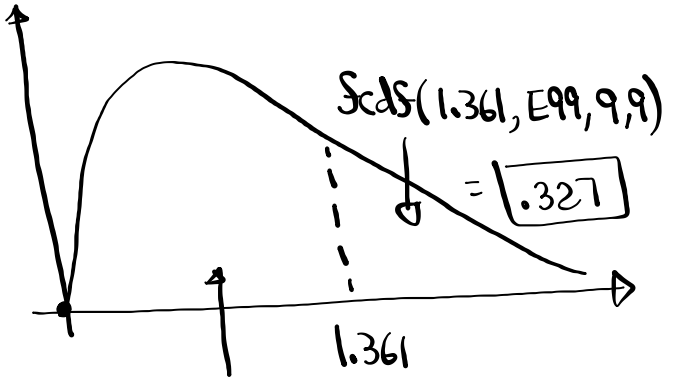
Verify CTS $F=\frac{S_1^2}{S_2^2}=\frac{9.8^2}{8.4^2}=1.361$

CTS $F=1.361$

TTT

NDF = DDF = 9

find p-value.



SG 32

fcdf(0, 1.361, 9, 9) = .673

P-value = 2 * Smaller area = 2(.327) = .654