

## Topic 25: Computing Confidence Intervals, Testing a Hypothesis

We have two populations, A and B, that we know to be approximately normally distributed. We want to look at the ratio of the variance of A to the variance of B. To do this we take a random sample of each. The sample from A has size 38 and sample standard deviation of 12.58. The sample from B has size 51 and sample standard deviation of 17.24.

Find the 95% confidence interval for  $\frac{\sigma_1^2}{\sigma_2^2}$

```
1 #
2 #   get a 95% confidence interval for the
3 #   ratio of the variances from the problem
4 source("../ci_2popvar.R")
5 #
6 ci_2popvar( 38, 12.58, 51, 17.24, 0.95)
```

```
> #   get a 95% confidence interval for the
> #   ratio of the variances from the problem
> source("../ci_2popvar.R")
> #
> ci_2popvar( 38, 12.58, 51, 17.24, 0.95)
  CI Low    CI_HIGH    Quotient    F Low    F High
0.2935815  0.9931256  0.5324597  0.5361454  1.8136691
  Top Var.    Top sd    Top size    Bot Var.    Bot sd
158.2564000  12.5800000  38.0000000  297.2176000  17.2400000
  Bot size    C level    Alpha/2
51.0000000  0.9500000  0.0250000
```

Test, at the 0.05 level, the null hypothesis  $H_0: \frac{\sigma_1^2}{\sigma_2^2} = 1$

against the alternative hypothesis  $H_1: \frac{\sigma_1^2}{\sigma_2^2} \neq 1$

```
8 #   Test the null hypothesis that the ratio of the
9 #   variances is 1 versus the alternative that the
10 #   ratio is not one. Do the test at the 0.05 level.
11 source("../hypo_2var.R")
12 #
```

```

12 # run FUNCTION
13 hypoth_2test_var( 38, 12.58, 51, 17.24,
14                   0, 0.05 )

```

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```

> # Test the null hypothesis that the ratio of the
> # variances is 1 versus the alternative that the
> # ratio is not one. Do the test at the 0.05 level.

```

```

> source("../hypo_2var.R")
> # run function
> hypoth_2test_var( 38, 12.58, 51, 17.24,
+                  0, 0.05 )

```

	H1	n top	s top
"v_1 != v_2"		"38"	"12.58"
v top		n bot	s bot
"158.2564"		"51"	"17.24"
v bot		quotient	crit low
"297.2176"	"0.532459719747418"	"0.536145391877096"	
crit high	decision	attained	
"1.81366905917175"	"Reject"	"0.0475722703085961"	