

## F Test

**Problem 1 :** Five measurements of the output of two units have given the following results(in kg of material per one hour of operation). Assume that both samples have been obtained from actual population, test at 10% significance level if two population have same variance.

$H_0 : S_1^2 = S_2^2$

$H_1 : S_1^2 \neq S_2^2$

```
> A=c(14.1, 10.1, 14.7, 13.7, 14.0)
> B=c(14.0, 14.5, 13.7, 12.7, 14.1)
> alpha = 0.1
> n1=length(A)
> n2=length(B)
> TV=qf(1-alpha, n1-1, n2-1)
> F=var(A)/var(B)
> if(F<=TV){print("Accept H0")}else{print("Reject H0")}
[1] "Reject H0"
```

**Problem 2 :** In order to compare two sources of nitrogen namely ammonium chloride and urea on grain yield of paddy, An Experiment was conducted, the results of the gain in yield of paddy under the two treatment are given below

Chloride : 13.4, 10.9, 11.2, 11.8, 14.0, 15.3, 14.2, 12.6, 17.0, 16.2, 16.5, 15.7

Urea : 12.0, 11.7, 10.7, 11.2, 14.8, 14.4, 13.9, 13.7, 16.9, 16.0, 15.6, 16.0

Which source of nitrogen has better yield?

```
> A=c(13.4, 10.9, 11.2, 11.8, 14.0, 15.3, 14.2, 12.6, 17.0, 16.2, 16.5, 15.7)
> B=c(12.0, 11.7, 10.7, 11.2, 14.8, 14.4, 13.9, 13.7, 16.9, 16.0, 15.6, 16.0)
> alpha = 0.05
> n1=length(A)
> n2=length(B)
> TV=qf(1-alpha, n1-1, n2-1)
> F=var(A)/var(B)
> if(F<=TV){print("Accept H0")}else{print("Reject H0")}
[1] "Accept H0"
```

## Chi square Test

**Aim :** To test if there is any association between the attributes, independence of attributes and goodness of fit.

**Problem 1 :** The below table gives the distribution of students according to the family type and the anxiety level :

Family Type	Anxiety levels		
	Low	Normal	High
Joint	35	42	61
Nuclear	48	51	68

```
> data = matrix(c(35, 42, 61, 48, 51, 68), ncol = 3, byrow = T)
> data
      [,1] [,2] [,3]
[1,]  35  42  61
[2,]  48  51  68
> alpha=0.05
> calcu = chisq.test(data)
> calcu
```

Pearson's Chi-squared test

```
data: data
X-squared = 0.53441, df = 2, p-value = 0.7655
```

```
> TV = qchisq(1-alpha,2)
> TV
[1] 5.991465
```

> H0 is accepted