```
> Conc=c( 0, 5, 10, 15, 20, 25, 30)
> Abso=c( 0.003, 0.127, 0.251, 0.390, 0.498, 0.625, 0.763)
>
> length(Abso)
[1] 7
>
> mean(Abso)
> [1] 0.3795714
```

```
> Conc=c( 0, 5, 10, 15, 20, 25, 30)
> Abso=c( 0.003, 0.127, 0.251, 0.390, 0.498, 0.625, 0.763)
> plot(Conc,Abso)
> length(Abso)
[1] 7
> mean(Abso)
[1] 0.3795714
> FitA=lm(Abso~Conc)
> summary(FitA)
```

```
Call:
lm(formula = Abso ~ Conc)

Residuals:
         1          2          3          4          5          6
 7
 0.0008929 -0.0009286 -0.0027500  0.0104286 -0.0073929 -0.0062143
 0.0059643

Coefficients:
             Estimate Std. Error t value Pr(>|t|)
(Intercept) 0.0021071  0.0047874    0.44    0.678
Conc        0.0251643  0.0002656   94.76 2.48e-09 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.007026 on 5 degrees of freedom
Multiple R-squared: 0.9994,     Adjusted R-squared: 0.9993
F-statistic:  8980 on 1 and 5 DF,  p-value: 2.481e-09
```

Regression Equation

***Abso.fitted = 0.0021 + 0.251 Conc***

**Remarks**

- **Number of Independent (Predictor) variables : k = 1**
- **Number of paired observations : n=7**
- **Degrees of freedom :**
  - **$df_1$ =k =1**
  - **$df_2$ = n-k-1 = 5**

**Regression Equation for FitA**

**Abso.fitted = 0.0021+ 0.0251 conc**

**TSS= 0.4435157**
**Mean (Abso)= 0.3795714**

**SSR=0.4432689**
**SSE=0.0002468214**

**TSS = SSR + SSE**
**0.4435157 = 0.4432689 + 0.0002468214**

Notice that TSS is the sum of SSR and SSE

```
> anova(FitA)
Analysis of Variance Table

Response: Abso
          Df  Sum Sq Mean Sq F value    Pr(>F)
Conc       1 0.44327 0.44327  8979.5 2.481e-09 ***
Residuals  5 0.00025 0.00005
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
>
```

Remark : The Total Sums of Squares is not included in the output.

**MSR = SSR/(k)**
**MSE = SSE/(n-k-1)**

**The test statistic is Fts = MSR/MSE**

**(I have added a subscript "ts" to emphasis the term's purpose as a Test Statistic for a hypothesis test)**

**MSE = SSE/n-k-1 = 4.936429e-05**
**MSR= SSR/k = 0.4432689**
**Test statistic = 36.64**

The associated p-value

The null hypothesis is the independent variables used in the model jointly describes the response of the fitted model.

- $H_0$: $\beta_1 = \beta_2 = ... = \beta_n = 0$
- $H_1$: At least one of the β values for the independent variables is not zero.

We have a very low p-value. So we reject the null hypothesis. The independent variables can indeed be used to build a model for the response variable