

```
##### Interaction bw X terms
```

```
data(iris)
```

```
library(ggplot2)
```

```
# relation bw Sepal length and width of 3 different species
```

```
qplot(Sepal.Length, Petal.Length, data = iris)
```

```
fit1=lm(Petal.Length~Sepal.Length,data=iris)
```

```
summary(fit1)
```

```
qplot(Sepal.Length, Petal.Length, data = iris,color = species)
```

```
#is species a significant factor
```

```
x=lm(Petal.Length~Sepal.Length+Species,data=iris)
```

```
summary(x)
```

```
#Is there any significant variation in Petal length across species
```

```
#we can ask whether some species tend to have flowers
```

```
#that have long-skinny petals vs. short-wide petals.
```

```
fit1=lm(Petal.Length~Sepal.Length*Species,data=iris) #interaction bw
```

```
#sepal length & species--> Sepal.Length*Species
```

```
#lets examine the statistical significance
```

```
anova(fit1)
```

```
# in case of Sepal.Length:Species,  $p < 0.05$ 
```

```
# Our numerical predictor variable Sepal Length is influenced by Species
```

```
#So we can conclude that the regression slopes do vary across the three
```

```
# quantitative relation bw petal length & sepal length influenced by spe
```

```
# Species ( $p < 0.05$ ):petal lengths (Y) vary systematically across the thre
```

```
# Sepal.Length ( $p < 0.05$ ): Petal length (Y) increased with sepal length (n
```

```
# EQNS FOR DIFFERENT SPECIES
```

```
summary(iris$Species) #factor variable with 3 levels- setosa, vers, vir
```

```
#factor variables: setosa is the reference
```

```
summary(fit1)
```

```
## interactions between numerical terms
```

```
## Does the association between Petal length & sepal length depend on pe
```

```
fit2b=lm(Sepal.Length~Petal.Length*Petal.width,data=iris)
```