

mammals

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mammals

references:

- Cannon, et al., Stat2, chapter 01, example 1.7
- [Sunda shelf, Wikipedia](#)

Import the data.

```
data <- read.csv("SpeciesArea.csv", header=TRUE)
head(data)
```

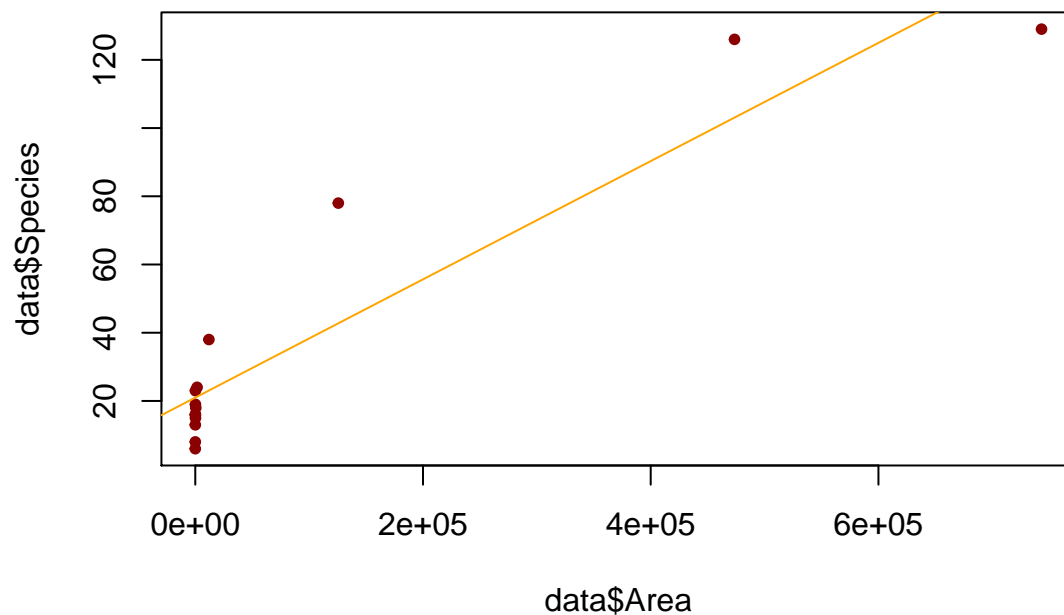
```
##      Name   Area Species logArea logSpecies
## 1 Borneo 743244    129 13.51880    4.85981
## 2 Sumatra 473607    126 13.06810    4.83628
## 3 Java 125628     78 11.74110    4.35671
## 4 Bangka 11964     38  9.38966    3.63759
## 5 Bunguran 1594     24  7.37400    3.17805
## 6 Banggi   450      18  6.10925    2.89037
```

```
dim(data)
```

```
## [1] 14  5
```

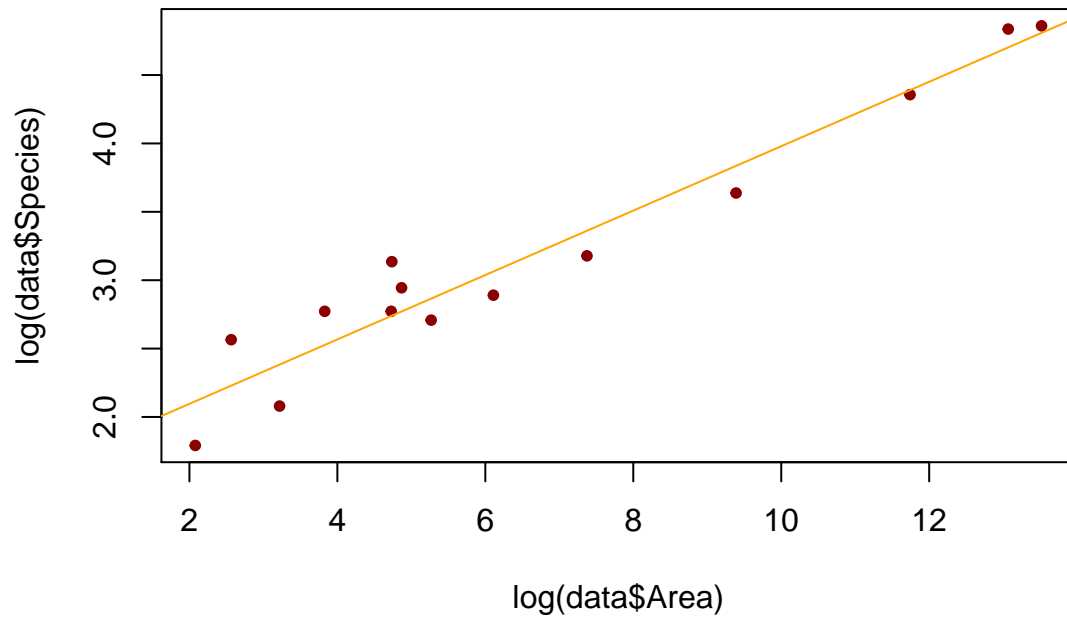
View the data.

```
plot(data$Area, data$Species,
      pch=20, col="darkred")
mammals.lm <- lm(Species ~ Area, data=data)
abline(mammals.lm, col="orange")
```



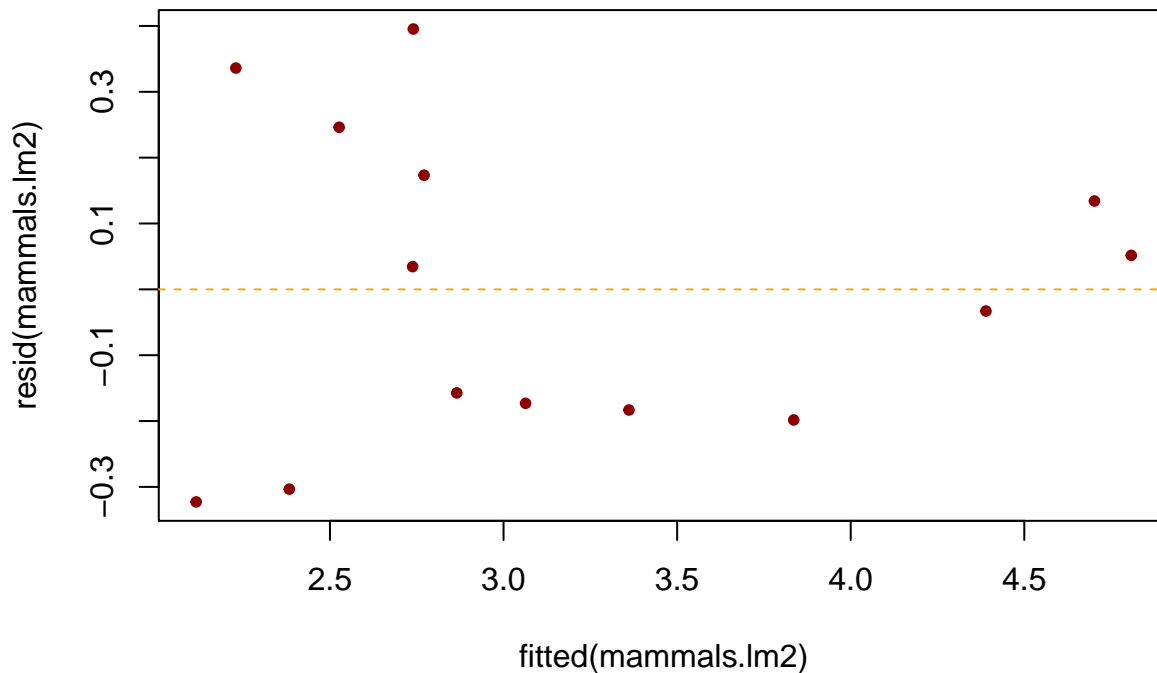
Transformation.

```
plot(log(data$Area), log(data$Species),  
     pch=20, col="darkred")  
mammals.lm2 <- lm(log(Species) ~ log(Area), data=data)  
abline(mammals.lm2, col="orange")
```



Residuals.

```
plot(fitted(mammals.lm2), resid(mammals.lm2),  
     pch=20, col="darkred")  
abline(h=0, col="orange", lty="dashed")
```



Relationship.

```
mammals.lm2
```

```
##  
## Call:  
## lm(formula = log(Species) ~ log(Area), data = data)  
##  
## Coefficients:  
## (Intercept)    log(Area)  
##      1.6249      0.2355
```

Prediction.

The actual number of mammal species on Java is 78.

```
new.data <- data.frame(Area=125628)           # area of Java  
log.species <- predict(mammals.lm2, new.data)  
species <- exp(log.species)  
species
```

```
##           1  
## 80.61058
```