

Olympics

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references:

- Cannon, et al., Stat2, chapter 01, example 1.8
- [Bob Beamon, 1968 Mexico City Olympic Games, YouTube](#)
- [model diagnostics for regression](#)

Import the data.

```
data <- read.csv("LongJumpOlympics.csv", header=TRUE)
head(data, 4)
```

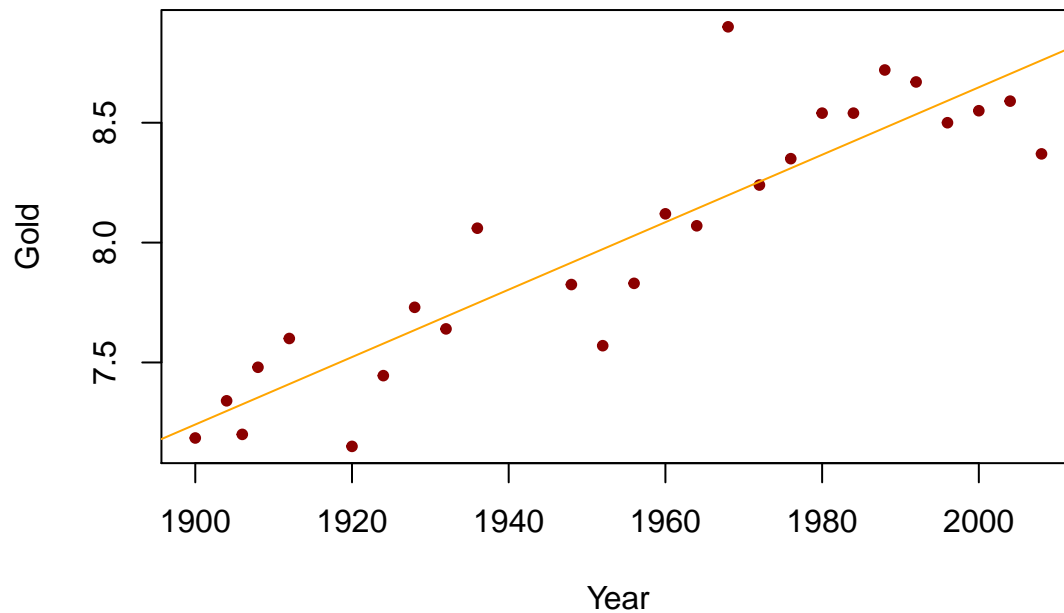
```
##   Year  Gold
## 1 1900 7.185
## 2 1904 7.340
## 3 1906 7.200
## 4 1908 7.480
```

```
dim(data)
```

```
## [1] 26  2
```

View the data.

```
plot(Gold ~ Year, data=data,
     pch=20, col="darkred")
olympics.lm <- lm(Gold ~ Year, data=data)
abline(olympics.lm, col="orange")
```



Linear model.

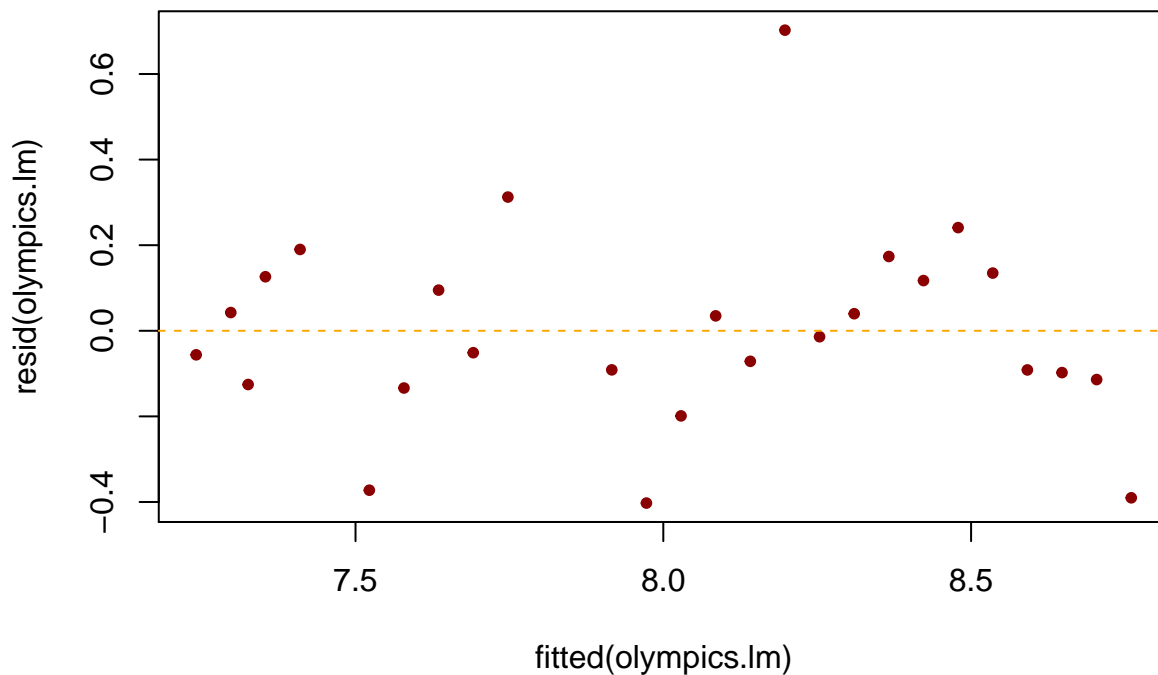
$$\widehat{Gold} = -19.484 + 0.014 Year$$

```
olympics.lm
```

```
##  
## Call:  
## lm(formula = Gold ~ Year, data = data)  
##  
## Coefficients:  
## (Intercept)      Year  
## -19.48359      0.01407
```

Residuals.

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



1968 residual.

```
y.1968 <- data[data$Year==1968, "Gold"]  
y.1968
```

```
## [1] 8.9
```

```
new.data <- data.frame(Year=1968)  
y.hat.1968 <- predict(olympics.lm, new.data)  
y.hat.1968
```

```
##      1
## 8.197615
```

```
residual.1968 <- as.numeric(y.1968 - y.hat.1968)
residual.1968
```

```
## [1] 0.7023854
```

Studentized residuals.

```
studentized.residuals <- rstudent(olympics.lm)
studentized.residuals[16]
```

```
##      16
## 3.766514
```

```
plot(studentized.residuals,
      pch=20, col="darkred")
abline(h=c(2, 1, -1, -2), col="orange", lty="dashed")
```

