

Poisson_fit2.R

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```
# Poisson_fit2.R
# Fitting the Poisson to frequency data

# Load necessary libraries
library(ggplot2)
library(MASS)

# Read in data set
poisdata <- read.table(header=T,colClasses=c("numeric","numeric"),text="
y obsfreq
0 24
1 16
2 16
3 18
4 15
5 9
6 6
7 5
8 3
9 4
10 3
11 0
12 1
")

# Generate offset y values for plot
poisdata <- transform(poisdata,yexp=y-0.1)
poisdata <- transform(poisdata,yobs=y+0.1)

# Print data
poisdata
```

##	y	obsfreq	yexp	yobs
## 1	0	24	-0.1	0.1
## 2	1	16	0.9	1.1
## 3	2	16	1.9	2.1
## 4	3	18	2.9	3.1
## 5	4	15	3.9	4.1
## 6	5	9	4.9	5.1
## 7	6	6	5.9	6.1
## 8	7	5	6.9	7.1
## 9	8	3	7.9	8.1
## 10	9	4	8.9	9.1

```
## 11 10      3  9.9 10.1
## 12 11      0 10.9 11.1
## 13 12      1 11.9 12.1

# Convert tabulated data to raw form for R
ydata <- rep(poisdata[, "y"], poisdata$obsfreq)

# Calculate mean and variance
mean(ydata)

## [1] 3.166667

var(ydata)

## [1] 7.770308

# Fit Poisson distribution
fitout <- fitdistr(ydata, "poisson")
fitout

##      lambda
## 3.1666667
## (0.1624466)

# Calculate expected frequencies
poisdata <- transform(poisdata, poisprob = dpois(poisdata$y, fitout$estimate))
poisdata <- transform(poisdata, expfreq = fitout$n * poisprob)

# Print revised data
poisdata

##      y obsfreq yexp yobs      poisprob      expfreq
## 1  0      24 -0.1  0.1 4.214384e-02  5.05726122
## 2  1      16  0.9  1.1 1.334555e-01 16.01466053
## 3  2      16  1.9  2.1 2.113045e-01 25.35654584
## 4  3      18  2.9  3.1 2.230437e-01 26.76524284
## 5  4      15  3.9  4.1 1.765763e-01 21.18915058
## 6  5       9  4.9  5.1 1.118316e-01 13.41979537
## 7  6       6  5.9  6.1 5.902225e-02  7.08266978
## 8  7       5  6.9  7.1 2.670054e-02  3.20406490
## 9  8       3  7.9  8.1 1.056896e-02  1.26827569
## 10 9       4  8.9  9.1 3.718710e-03  0.44624515
## 11 10      3  9.9 10.1 1.177591e-03  0.14131096
## 12 11      0 10.9 11.1 3.390036e-04  0.04068043
## 13 12      1 11.9 12.1 8.945928e-05  0.01073511

# Generate plot showing frequencies
ggplot(poisdata, aes(yobs, obsfreq)) +
  geom_bar(stat = "identity", width = 0.05, fill = "blue") +
  geom_point(color = "blue", size = 3) +
  geom_bar(aes(yexp, expfreq), stat = "identity", width = 0.05, fill = "red") +
  geom_point(aes(yexp, expfreq), color = "red", size = 3) +
  ggtitle("Fitting the Poisson to frequency data")
```

Fitting the Poisson to frequency data

