**MAT2001 – Statistics for Engineers - ELA (R Code Studio), Winter Semester 2020-2021**

**Lab Assessment - V**

**By: Jonathan Rufus Samuel (20BCT0332) Date: 17.6.2021**

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Write R code to solve the following problems:**

**Q1) When a random Variable takes the values of 0,1,2,3,4,5 and 6, the observed frequencies are 109,53,131,12,35,21, and 12. Fit a Poisson Distribution to the above data and test the goodness of fit.**

A: Code is as follows:

#Q5

x = c(0,1,2,3,4,5,6)

f = c(109,53,131,12,35,21,12)

N = sum(f)

fx = sum(f\*x)

mean = fx/N

lambda = mean

#Finding Probability Function P(X) from 0 to 6

p0 = dpois(0,lambda)

p1 = dpois(1,lambda)

p2 = dpois(2,lambda)

p3 = dpois(3,lambda)

p4 = dpois(4,lambda)

p5 = dpois(5,lambda)

p6 = dpois(6,lambda)

P = c(p0,p1,p2,p3,p4,p5,p6)

P

E = c(P\*N)

E1 = c((f-E)^2/E)

E1

X2 = sum(E1)

X2

**Output (via Command Window):**

> #Q5

> x = c(0,1,2,3,4,5,6)

> f = c(109,53,131,12,35,21,12)

> N = sum(f)

> fx = sum(f\*x)

> mean = fx/N

> lambda = mean

> #Finding Probability Function P(X) from 0 to 6

> p0 = dpois(0,lambda)

> p1 = dpois(1,lambda)

> p2 = dpois(2,lambda)

> p3 = dpois(3,lambda)

> p4 = dpois(4,lambda)

> p5 = dpois(5,lambda)

> p6 = dpois(6,lambda)

> P = c(p0,p1,p2,p3,p4,p5,p6)

> P

[1] 0.16681252 0.29874200 0.26750624 0.15969094 0.07149702 0.02560858 0.00764367

> E = c(P\*N)

> E1 = c((f-E)^2/E)

> E1

[1] 35.169247 30.639243 9.768500 37.982261 2.602923 13.720335 29.358106

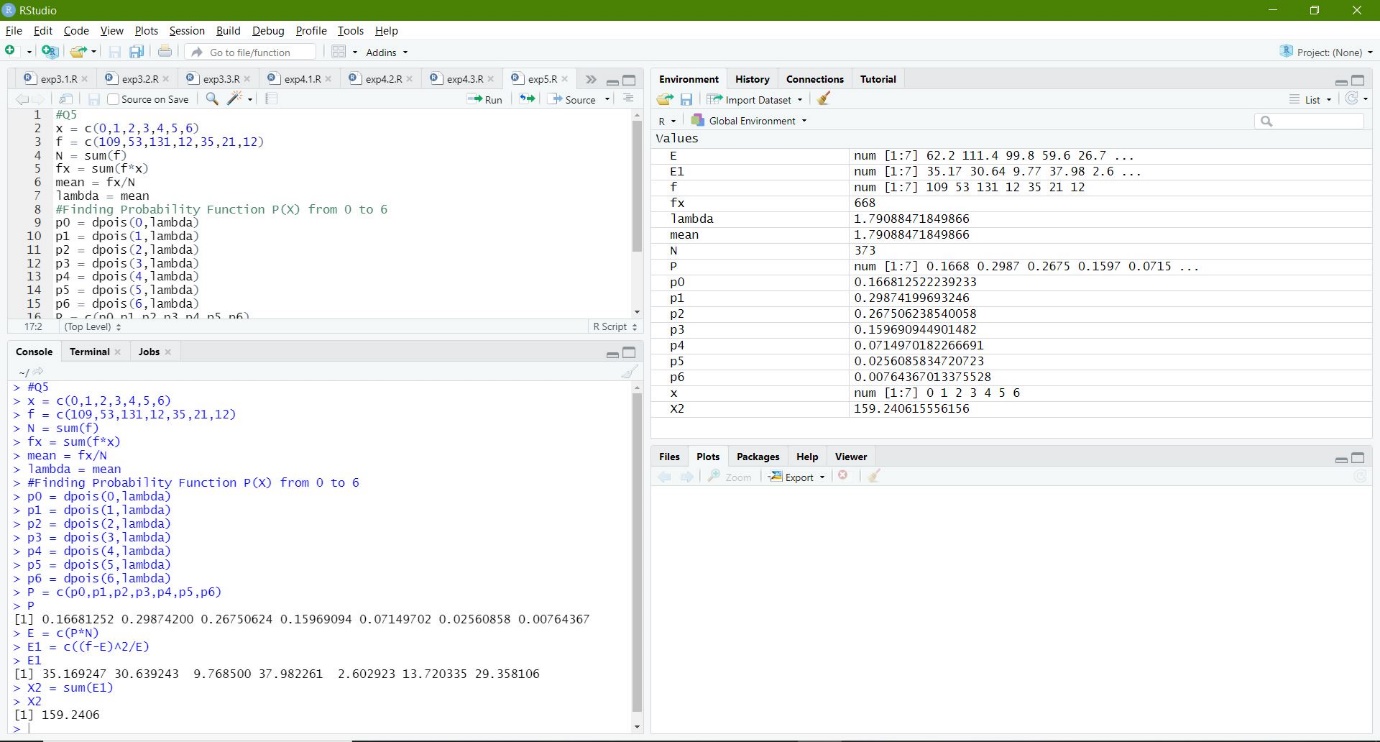
> X2 = sum(E1)

> X2

[1] 159.2406

Therefore, Goodness of Fit = Chi^2 = 159.2406

**Implementation on R Studio Code (via Command Window):**



\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_