

DATASET #1

(16)

ex We have a sample of 50 observations of a discrete distribution. Determine if this sample fits a Poisson Dist. (Use $\alpha=0.05$)

MLE for Poisson dist. is $\hat{\alpha} = \bar{x}$ $\bar{x} = 4.7$

$$P_j = P(X=j) = \frac{e^{-\alpha} \alpha^j}{j!} \rightarrow E_0 = 50 \frac{e^{-4.7} 4.7^0}{0!} = 0.4547$$

$$E_1 = 50 \frac{e^{-4.7} 4.7^1}{1!} = 2.1373$$

Outcome	O_j	E_j
0	1	0.4547
1	3	2.1373
2	9	5.0228
3	3	7.8691
4	12	9.2462
5	8	8.6914
6	3	6.8083
7	3	4.5713
8	2	2.6856
9	1	1.4025
10	2	0.6591
11	3	0.2816
		$\vdots$
		$50(P(X \geq 12)) = 0.1694$

$$\chi^2_0 = 11.7490$$

$$\chi^2_{0.05, 6-1-1} = 9.4877$$

$$\text{Since } \chi^2_0 > \chi^2_{0.05, 4}$$

We reject H_0 !

* We could have merged 8-11 with 7 instead of merging 7 with 6.

For that instance:

$$\chi^2_0 = 9.9811$$