

✓7

i	0	1	2	3	4
m:	109	65	22	3	1
P:	$e^{-\lambda}$	$\lambda e^{-\lambda}$	$\frac{\lambda^2 e^{-\lambda}}{2}$	$\frac{\lambda^3 e^{-\lambda}}{6}$	$\frac{\lambda^4 e^{-\lambda}}{24}$

$$P(X) = \frac{\lambda^k e^{-\lambda}}{k!} \quad L = 0.05.$$

$$\Delta \leadsto \chi^2(4-1-1) = \chi^2(2)$$

0.407

$$L = (e^{-\lambda})^{109} \cdot (\lambda \cdot e^{-\lambda})^{65} \left(\frac{\lambda^2}{2} e^{-\lambda}\right)^{22} \left(\frac{\lambda^3}{6} e^{-\lambda}\right)^3 \frac{\lambda^4}{24} e^{-\lambda} = \frac{\lambda^{122} e^{-200\lambda}}{C}$$

$$\ln L = 122 \ln \lambda - 200\lambda - \ln C.$$

$$\frac{\partial \ln L}{\partial \lambda} = \frac{122}{\lambda} - 200 = 0 \Rightarrow \hat{\lambda} = 0.61$$

$$\frac{\partial^2 \ln L}{\partial \lambda^2} = -\frac{122}{\lambda^2} \Rightarrow \text{max.}$$

$$n\hat{P}: \quad 108.67 \quad 66.29 \quad 40.22 \quad 4.11 \quad 0.63$$

0.05 signifikant

i	0	1	2	3/4
m:	109	65	22	4
P:	$e^{-\lambda}$	$\lambda e^{-\lambda}$	$\frac{\lambda^2 e^{-\lambda}}{2}$	$\frac{4\lambda^3 + \lambda^4}{24} e^{-\lambda}$

$$\Delta \leadsto \chi^2(4-1-1) = \chi^2(2)$$

0.407

$$L = (e^{-\lambda})^{109} (\lambda e^{-\lambda})^{65} \left(\frac{\lambda^2}{2} e^{-\lambda}\right)^{22} \left(\frac{4\lambda^3 + \lambda^4}{24} e^{-\lambda}\right)^4 = \frac{e^{-200\lambda} \lambda^{109}}{C} (4\lambda^3 + \lambda^4)^4$$

$$\ln L = 109 \ln \lambda - 200\lambda + 4 \ln(4\lambda^3 + \lambda^4)$$

$$\frac{\partial \ln L}{\partial \lambda} = \frac{109}{\lambda} - 200 + 4 \frac{12\lambda^2 + 4\lambda^3}{4\lambda^3 + \lambda^4} = \frac{109}{\lambda} - 200 + \frac{4\lambda + 16}{4\lambda + \lambda^2} = 0$$

$$4 \cdot 36.1155\lambda - 200\lambda - 200\lambda^2 + 4\lambda + 16\lambda = 0$$

$$-200\lambda^2 - 6.78\lambda + 4\lambda + 16 = 0$$

$$\lambda^2 + 3.39\lambda - 2.42 = 0$$

$$\Delta = 3.39^2 + 4 \cdot 2.42 = 21.0706$$

$$\hat{\lambda} \approx 0.605$$

max.

$$\frac{\partial^2 \ln L}{\partial \lambda^2} = -\frac{109}{\lambda^2} + \frac{16(4\lambda + 1) - (4 + 16\lambda)(4\lambda + 16\lambda)}{(4\lambda + \lambda^2)^2} = -\frac{109}{\lambda^2} + \frac{-1152 + 32\lambda + 4\lambda^2}{(4\lambda + \lambda^2)^2} < 0$$

max.

αP_i : 108.93 66.19 20.11 4.70

$$\chi^2 = \frac{(108.93 - 109)^2}{108.93} + \frac{(66.19 - 65)^2}{66.19} + \frac{(20.11 - 22)^2}{20.11} + \frac{(4.70 - 4)^2}{4.70} = 0.301$$

$$P\text{-value} = P(D \geq \hat{\delta} | H_0) = \int_{0.301}^{\infty} q(t) dt \approx 0.86 > 0.05$$

Неследует отвергать H_0 .