

### 3rd exercises for SIM'2018

#### Ex. 1

We have 10 observations from i.i.d. Poisson model and  $\bar{y} = 3.4$ . Construct 95 % confidence interval for  $\lambda$  using asymptotic result in Eq. (2.7).

#### Ex. 2

We have two sets of stars, A and B, and we have observed their magnitudes. In set A we have 61 observations with mean magnitude  $-24.4$ , standard deviation is 3.9. In set B there is 71 observations, mean magnitude is  $-23.2$  with standard deviation of 3.8. Test if the expected magnitudes could be the same in the groups.

#### Ex. 3

Test if hair color and color of eyes are independent. The data from 95 persons is

hair \ eyes	blue	brown	other
blonde	32	14	6
dark	12	22	9

Note to Exs. 2 and 3. If your software cannot compute the cdf and inverse cdf for  $t$ -distribution you can use  $\mathcal{N}(0, 1)$  instead. If you cannot compute  $\chi^2$ -distribution, you can approximate it with  $\mathcal{N}(\kappa, 2\kappa)$ , where  $\kappa$  is the degrees of freedom. If you cannot compute cdf and inverse cdf values for  $\mathcal{N}(0, 1)$ , change the software.