

## 2nd exercises for SIM'2020

### Ex. 1

- a) Derive log-likelihood function for model where  $Y_1, \dots, Y_n$  are i.i.d and follow Poisson distribution  $\mathcal{P}(\lambda)$ .
- b) Make figure of  $l(\lambda)$  in cases where (i)  $n = 10$  and  $\bar{y} = 5$ , (ii)  $n = 20$  and  $\bar{y} = 6$ .

### Ex. 2

- a) Formulate maximum likelihood equations for  $n$  i.i.d observations from Poisson distribution.
- b) Derive the maximum likelihood estimate for parameter  $\lambda$  from ML equations

### Ex. 3

- a) Show that mean  $\bar{y}$  is the MLE for  $\mu$  when  $Y_i$  are i.i.d and follow  $\mathcal{N}(\mu, 1)$ .
- b) Make figure of  $l(\mu)$  when  $\bar{y} = 5$  and (i)  $n = 15$ , (ii)  $n = 30$ .

### Ex. 4

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