

## 6th exercises for SIM'2020

### Ex. 1

Do kernel density estimation for one-dimensional data `asteroid_density.dat`, where the densities (in  $\text{g/cm}^3$ ) of some asteroids are recorded. Test either few different kernels or few values of smoothing parameter  $h$ . Plot the density estimates. Can there be 'unphysical' features in the density estimate?

### Ex. 2

Draw a sample of 1000 observations from three-dimensional multinormal distribution. Vector of expected values is  $\boldsymbol{\mu} = (1, 2, 3)$  and covariance matrix is

$$\boldsymbol{\Sigma} = \begin{bmatrix} 1 & 0.5 & 1.25 \\ 0.5 & 2 & 1.75 \\ 1.25 & 1.75 & 3 \end{bmatrix}$$

Use Eq. (6.7) or (6.8). When done, do scatterplots of  $Y_1$  against  $Y_2$ ,  $Y_1$  against  $Y_3$ , and  $Y_2$  against  $Y_3$ .