

Solutions to selected exercises from Chapter 11 of *Wasserman — All of Statistics*

(1)

(2) See the Jupyter Notebook 2.ipynb.

(3) Set $M = \max\{x_1, \dots, x_n\}$. Then

$$\mathcal{L}(\theta) = \begin{cases} 0 & \text{if } \theta < M \\ \theta^{-n} & \text{if } \theta \geq M \end{cases}.$$

Thus,

$$f(\theta|x^n) \propto f(\theta)\mathcal{L}(\theta) = \begin{cases} 0 & \text{if } \theta < M \\ \theta^{-n-1} & \text{if } \theta \geq M \end{cases}.$$

The integral is $\int_M^\infty \theta^{-n-1} = \frac{1}{n}M^{-n}$. Hence

$$f(\theta|x^n) = \begin{cases} \frac{n \max\{x_1, \dots, x_n\}^n}{\theta^{n+1}} & \text{if } \theta \geq \max\{x_1, \dots, x_n\} \\ 0 & \text{else} \end{cases}$$

(4)