

## Homework Assignment for Chapter 5 (Due by 3pm on Feb. 11)

Reference Exercise Problems: Text Book, 5.8 Exercises.

### Homework problems

**Problem 1** Let  $X$  be a continuous random variable with probability density function

$$f(x) = \begin{cases} \frac{1}{2} & \text{for } 1 \leq x \leq 2 \\ \frac{1}{2} & \text{for } 3 \leq x \leq 4 \\ 0 & \text{for elsewhere} \end{cases} \quad (1)$$

1. Draw the graph of  $f$ .
2. Determine the distribution function  $F$  of  $X$ , and draw its graph.

**Problem 2** Let a continuous random variable  $X$  be given that takes values in  $[0, 1]$ , and whose distribution function  $F$  satisfies

$$F(x) = -x + 2x^2 - x^4 \text{ for } 0 \leq x \leq 1. \quad (2)$$

1. Compute  $P(\frac{1}{4} \leq x \leq \frac{3}{4})$
2. What is the probability density function of  $X$ ?

**Problem 3** The probability density function  $f$  of a continuous random variable  $X$  is given by:

$$f(x) = \begin{cases} cx + 3 & \text{for } -3 \leq x \leq -2 \\ 3 - cx & \text{for } 2 \leq x \leq 3 \\ 0 & \text{for elsewhere} \end{cases} \quad (3)$$

1. Compute  $c$ .
2. Compute the distribution function of  $X$ .

**Problem 4** Compute the median of an  $Exp(\lambda)$  distribution.

**Problem 5** Compute the median of a  $Par(12)$  distribution.