

# Exercises Week 2

## DSP

1. Consider the following discrete signal  $x[n]$ :

$$x[n] = \begin{cases} 1 + \frac{n}{3}, & -3 \leq n \leq -1 \\ 1, & 0 \leq n \leq 3 \\ 0, & \text{elsewhere} \end{cases}$$

- Find the values of  $x[n]$  and represent the signal graphically
  - Represent graphically the signal  $x[-n + 4]$
  - Write the expression of  $x[n]$  based on the signal  $\delta[n]$
  - Write the expression of  $x[n]$  based on the signal  $u[n]$
2. Consider the following signal:

$$x[n] = \begin{cases} 1, & -1 \leq n \leq 2 \\ \frac{1}{2}, & 3 \leq n \leq 4 \\ 0, & \text{elsewhere} \end{cases}$$

Represent graphically the following signals:

- $x[n - 2]$
- $x[n + 2]$
- $x[4 - n]$
- $x[n] \cdot u[2 - n]$
- $x[n - 1] \cdot \delta[n - 3]$
- $x[n^2]$
- The even part of  $x[n]$
- The odd part of  $x[n]$