

# Test 3 - No.1

DEDP 2017-2018

Consider the received signal

$$r(t) = \underbrace{A^2 \cdot t}_{s(t)} + \text{noise},$$

where  $A$  is unknown, and the noise has Gaussian distribution  $\mathcal{N}(0, \sigma^2 = 1)$ . The receiver takes three samples at times  $t_1 = 1, t_2 = 2, t_3 = 3$ , with values  $r_1 = 5, r_2 = 7, r_3 = 8$ .

- a. Considering that either  $A = 0$  (hypothesis  $H_0$ ) or  $A = 4$  (hypothesis  $H_1$ ), decide which is the detected value, using Maximum Likelihood decision criterion.
- b. Considering that  $A$  can be anything, estimate the value  $A$  using Maximum Likelihood estimation.