

Test 2 - No.1

DEDP 2017-2018

Exercises

Consider detection of a signal with two possible values:

- $s_0 = -1$ (hypothesis H_0), affected by noise with zero-mean triangular distribution;
- $s_1 = +1$ (hypothesis H_1), affected by noise with zero-mean uniform distribution.

The receiver takes a single sample r . The likelihood functions $w(r|H_0)$ and $w(r|H_1)$ are shown below. The probabilities of the two hypotheses are:

$$P(H_0) = \frac{2}{3}, \quad P(H_1) = \frac{1}{3}$$

- (1p) Find the values h_1 and h_2 . Justify.
- (2p) What is the detected signal using **Maximum Likelihood criterion**, if the sample is $r = -0.3$? Justify.
- (3p) Compute the probability of **correct detection of s_1** and the probability of **misses**, for the **Maximum Likelihood criterion**. (*Hint*: Don't forget about the probabilities $P(H_0)$ and $P(H_1)$).
- (3p) Find the threshold value T for the **minimum probability of error criterion**.

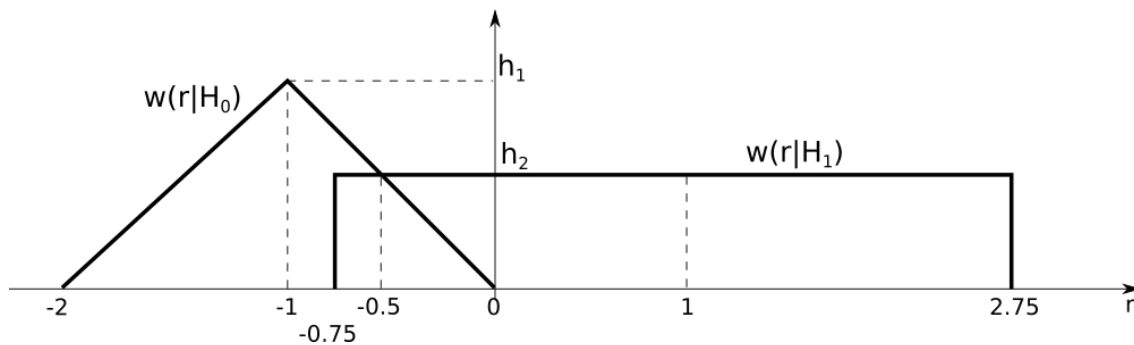


Figure 1: Likelihood functions