

Test 2 - No.3

DEDP 2017-2018

Consider detection of a signal with two possible values, s_0 (hypothesis H_0) or s_1 (hypothesis H_1), affected by noise with zero-mean triangular distribution. The probabilities of the two hypotheses are:

$$P(H_0) = \frac{1}{4}, \quad P(H_1) = \frac{3}{4}$$

The receiver takes a single sample r . The likelihood functions $w(r|H_0)$ and $w(r|H_1)$ are shown below.

- (1p) What are the two values of the signal, s_0 and s_1 , according to the graphic?
- (1p) Find the value h . Justify.
- (2p) What is the detected signal using **Maximum Likelihood criterion**, if the sample is $r = 0.8$? Justify.
- (3p) Compute the probability of **miss** and the probability of **false alarm**, for the **Maximum Likelihood criterion**. (*Hint*: Don't forget about the probabilities $P(H_0)$ and $P(H_1)$).
- (2p) Find the threshold value T for the **minimum probability of error criterion** (you can use geometry).

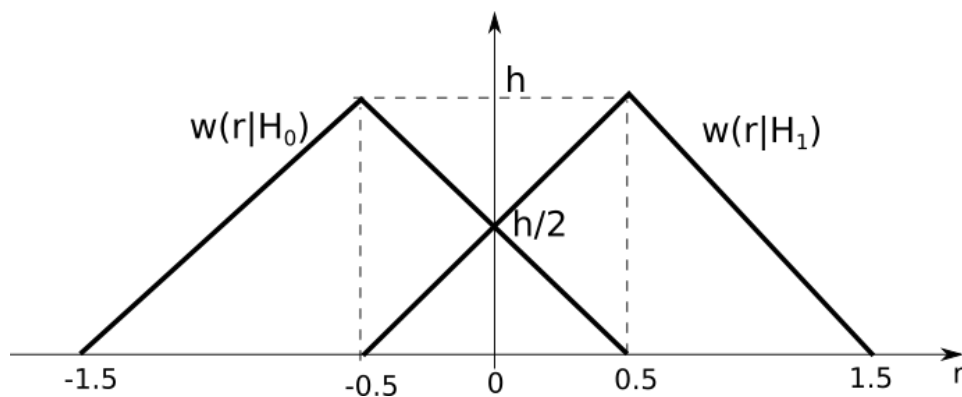


Figure 1: Likelihood functions