Bayes TEST

Let C_{ij} be the cost associated with (D_i, H_j), which denotes the decision to accept H_i when H_j was, in fact, true.

The Average cost, which is known as the Bayes Risk can be written as

$$\overline{C} = C_{00}\,P(D_0, H_0) + C_{01}P(D_0, H_1) + C_{10}\,P(D_1, H_0) + C_{11}\,P(D_1, H_1)$$

C_{ij} are the costs associated with each outcome. Usually C_{00} and C_{11} are 0, because they reflect correct decisions.

In general we Assume

- $C_{10} > C_{00}$
- $C_{01} > C_{11}$

The test that minimizes the cost $\overline{C}$ is called the Bayes test, and can be expressed in terms of a likelihood Ratio test.

BAYES RISK

$$\bar{C} = C_{00}P_{00} + C_{10}P_{10} + C_{01}P_{01} + C_{11}P_{11}$$

[Expected value]

	H_0 True	H_1 True
Decide H_0	P_{00} / C_{00}	P_{01} / C_{01}
Decide H_1	P_{10} / C_{10}	P_{11} / C_{11}

The threshold value "η" for the likelihood ratio test is computed as

$$\eta = \frac{(C_{10} - C_{00})\,P(H_0)}{(C_{01} - C_{11})\,P(H_1)}$$

Formula sheet

L.R.T

$$\Lambda(x) \underset{H_0}{\overset{H_1}{\gtrless}} \eta$$