In order to test customer satisfaction with a given service, we conduct a survey and define a random variable Yi as follows:

Yi = 1 if customer i is satisfied

Yi = 0 if the customer i is not satisfied

Given the identical and independent Bernoulli distributed samples y1, …, yn with

P[Yi = 0] = θ

P[Yi = 1] = 1 – θ

we want to test the hypotheses H0: θ = θ0 = 0.52 et H1 = θ = θ1 = 0.48

* Construct the likelihood of the observations y1, …, yn and explain the rejection region of H0 (i.e., error of type 1) from the test of Neyman-Pearson (for the numerical application, we will choose a risk of the first kind α = 0.1).
* Determine P[H0 rejected|H1 true]

The likelihood function:

H0: θ = θ0 = 0.52

H1: θ = θ1 = 0.48

Let T = y1+ y2 + … + yn

L(y1, y2, …, yn) =