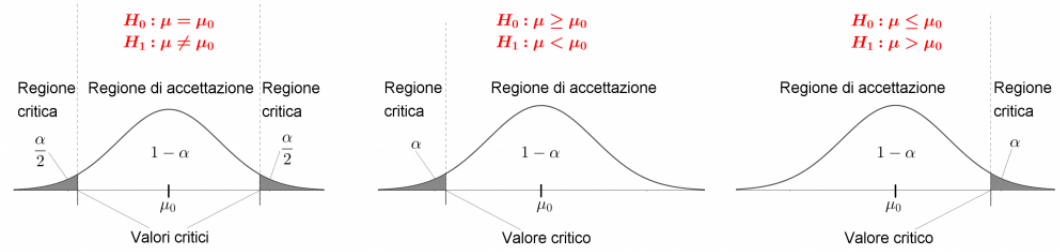
RAGE HYPOTHESIS TEST

A population average hypothesis test can be formulated in the following three ways:

$$a)\begin{cases} H_0 : \mu = \mu_0 \\ H_1 : \mu \neq \mu_0 \end{cases} \quad b)\begin{cases} H_0 : \mu \geq \mu_0 \\ H_1 : \mu < \mu_0 \end{cases} \quad c)\begin{cases} H_0 : \mu \leq \mu_0 \\ H_1 : \mu > \mu_0 \end{cases}$$

where test a) is bilateral while b) and c) are unilateral (see figures below).



As is the case with confidence intervals, the distribution of the estimator should be established based on the information you have about the population.

For this purpose, two cases will be analyzed:

- population with normal distribution and known variance or with any and large samples distribution;
- population with normal distribution, unknown variance and small samples.

Normal population case with known variance or any population and large samples

In this case, to carry out the test, you can use the test statistics with standard normal distribution

$$Z_{test} = \frac{\overline{x} - \mu_0}{\sqrt{\frac{\sigma^2}{n}}} = \frac{\overline{x} - \mu_0}{\sqrt{\frac{s^2}{n}}}$$

Let's look at the double formula: the first is used when the sample comes from a normal population with variance σ^2 note; while the second formulation is used in the case of a large sample extracted from any population (not necessarily normal) having sample variance equal to s^2.

Defined the level of significance α and determined by the tables the critical value $z_{1-\alpha}$ (for unilateral testing) and $z_{1-\frac{\alpha}{2}}$ (for bilateral tests), The outcome of the test is

- (for a bilateral test type a)) refusal H_0 if $|Z_{test}| > z_{1-\frac{\alpha}{2}}$
- (for a unilateral left test type b)) refusal H_0 if $Z_{test} < -z_{1-\alpha}$
- (for a unilateral right test type c)) rejection H_0 if $Z_{test} > z_{1-\alpha}$

Normal population case with unknown variance and small samples

In this case, to carry out the test statistic with Student t distribution is used

$$T_{test} = \frac{\overline{x} - \mu_0}{\sqrt{\frac{s^2}{n}}}$$

The degrees of freedom are $\nu = n - 1$ and set a value of α we can read from the tables of the Student t distribution the critical value $t_\alpha(\nu)$ (for unilateral testing) and $t_{\frac{\alpha}{2}}(\nu)$ (for bilateral tests), The outcome of the test is

- (for a bilateral test type a)) refusal H_0 if $|T_{test}| > t_{\frac{\alpha}{2}}(\nu)$
- (for a unilateral left test type b)) refusal H_0 if $T_{test} < -t_\alpha(\nu)$
- (for a unilateral right test type c)) rejection H_0 if $T_{test} > t_\alpha(\nu)$

THE NOTEBOOK

TRIGONOMETRY

Rope theorem, projection theorem, breast and cosine theorem

Rope theorem The measure of a rope of a circumference is equal to the product between the diameter measurement and the breast of any of the ang

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TRIGONOMETRY

Theorems related to the right triangle

Given a right triangle ABC, the values of the cathets can be determined by measuring the acute angle β and the hypotenuse c

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BASIC ALGEBRA

Algebraic roots

Let's look at the following problem: what is the positive number that squared gives 9? Let's consider the same problem again, but in the field of

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