

Hypothesis tests

A **hypothesis test** involves testing a claim, or **null hypothesis** H_0 , about a parameter against an alternative, H_1 . A decision to **reject** H_0 or **not reject** H_0 uses sample evidence to *calculate* a **test statistic** which is judged against a **critical value**. H_0 is maintained unless it is made untenable by sample evidence. Rejecting H_0 when we should not is a **Type I error**.

The probability (we are prepared to accept) of making a Type I error is called the **significance level** α and yields the critical value. The *smallest* α at which we can just reject H_0 is the ***p*-value** of the test. Not rejecting H_0 when we should is a **Type II error**, with probability β . The **power** of a hypothesis test is $1 - \beta$.

An **interval estimate** for a parameter is a *calculated* range within which it is deemed likely to fall. Given α , the set of intervals from infinitely repeated random samples of size n will contain the parameter $(100 - \alpha)\%$ of the time: each interval is a $(100 - \alpha)\%$ **confidence interval**.