# Hypothesis Testing

## Four steps to test hypothesis

1. Formulate and , and specify
2. Using the sampling distribution of an appropriate test statistic, determine a critical region of size
   1. Commonly used: normal
3. Determine the value of the test statistic from the sample data
4. Check whether the value of the test statistic falls into the critical region

## Type I and Type II errors

1. Type I error (): False positive (rejection) error

Rejection of a null hypothesis when it is true

1. Type II error (): False negative (acceptance) error

Acceptance of the null hypothesis when it is false

## Tests Concerning Mean

### From one population

Assuming either the samples come from normal pop or the sample size is large enough to justify normal approximations (CLT).

Based on the LR (likelihood ratio test), use z-stat () for test of

If the number of observations less than 30, use t-stat () with degree of freedom for

### Concerning Difference between / within Means

With equal variance and independent assumption, For testing , use z-stat

If and are small (<30) , use t-stat with degree of freedom

If two samples are not independent, using paired t-test

## Test concerning Variances

### From one population

Use -stat for test of , with critical regions as or

### Concerning the ratio of two variances

Use for with critical regions

## Test Concerning Proportions