

Simplified notes for Msc semII (2018-20) on

χ^2 (Chi-square) test

In sampling studies it is normally not possible to be coincide between expected and observed frequency of each specific value of a set of observation. The chi-square test tells about the significance of the difference between expected and observed frequencies. If difference is little the fit is good, otherwise fit is poor. Thus it is used to test the goodness of fit.

Analysis about the fitness of data through χ^2 test

Formula applied

$$\chi^2 = \sum \left(\frac{(O-E)^2}{E} \right)$$

Where, O = observed frequency, E = Expected frequency.

Steps of the test

- a) A hypothesis is established i. e. null hypothesis
- b) Square of the difference between observed frequency and Expected frequency is calculated i. e. $(O - E)^2$
- c) $(O - E)^2$ is divided by expected frequency and thus obtained all the values are added.
- d) Now a chi-square value is searched from χ^2 table at a certain level of significance, usually at 5% or 1%

e) Inference

At certain degree of level of significance –

✓ - If Calculated value of χ^2 is greater than table value of χ^2 , we reject the hypothesis.

✓✓ - If calculated value of χ^2 is zero, then observed frequencies and expected frequencies completely coincide.

✓✓✓ - If calculated value of χ^2 is less than table value of χ^2 , it is said to be non significant. This indicates that difference between observed frequencies and expected frequencies might be due to sampling fluctuations.

Assumptions for the proper result of the test

- Observations should be large.
- All the observations should be independent.
- All the events should be mutually exclusive.
- Data should be in original unit

Characteristics of χ^2 test

- It is a general test .it has great importance in research.
- It is based on frequencies or events.
- It is not based on mean or S.D etc.
- The test can be used between the entire set of observed and expected frequency.

Application or use

- a) To test hypothesis
- b) To test discrepancy between observed frequency and expected frequency
- c) In Biology it is especially used to test the goodness to fit the distribution of observed data with expected data