

χ^2 Goodness of Fit Test

We perform a χ^2 - test: Goodness of Fit (GOF-test) in Excel.

At a municipal election the votes was distributed like this:

Party	Soc.	Rad.	Kons.	SF	DF	Venstre	Total
%	26.2	5.8	11.8	13.1	14.2	28.9	100

Shortly before the next election 920 persons responded on a opinion survey.

The question was: "Who would you vote on, if there was selection tomorrow?"

The answers was distributed like this:

Party	Soc.	Rad.	Kons.	SF	DF	Venstre	Total
Number	258	56	89	133	112	272	920

Assume the Null Hypothesis: The distribution is unchanged compared to the selection.

- a. Calculate a table with an expected number of votes under the Null Hypothesis.
- b. Calculate the critical value k , the test χ^2 , and the probability p .
- c. Determine on the level of significance 5% , whether the Null Hypothesis must be rejected.

a) To calculate the expected number of votes, we take the percentages from the first table as an example:

Party	obs. Num	exp. Num
Soc.	258	242.24
Rad.	56	52.32
Kons.	89	84.02
SF	133	121.58
DF	112	105.76
Venstre	272	265.12

b) level of significance = 0.05
 Number of categories = 7
 degrees of freedom = 7 - 1 = 6
 critical value $k = \chi^2_{0.05, 6} = 12.592$
 test $\chi^2 = 12.592$
 probability $p = 0.05$

c) We may accept the Null Hypothesis if the test statistic is less than the critical value. (Two ways to determine the critical value). The distribution of the test statistic is χ^2 .

