

x2test1matrix - Chi-square Test

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The χ^2 (chi-square) test is used to assess the dependence between variables in an $r \times s$ contingency table. To run the program, a data matrix must simply be placed on the stack.

1 Equation:

$$\chi^2 = \sum \frac{(Obs - Exp)^2}{Exp}$$

Where:

- Obs = observed frequency;
- Exp = expected frequency;
- df = degrees of freedom = $(r - 1)(s - 1)$.

In this context, Exp represents the expected frequency for positive and negative outcomes (e.g., disease occurrence, drug effects, etc.).

2 Files:

1. Program
2. Source code
3. This tutorial

3 Example of use:

The program performs the test using a significance level of $p = 0.05$, which can be modified in the source code. The example below refers to the dataset reported in Vieira (2000). In this case, the test aims to verify whether different treatment centers influenced the recurrence of strokes. Data input must follow the convention of treatments/types/variations as rows, and binomial responses (Yes/No) as columns.

Table — Distribution of recurrence by treatment center

Center	Recurrence (Yes)	Recurrence (No)
A	16	179
B	12	70
C	21	78
D	12	54

In agreement with Vieira (2000), the χ^2 value suggests low dependence of treatment centers on disease recurrence ($\phi = 0.156$).

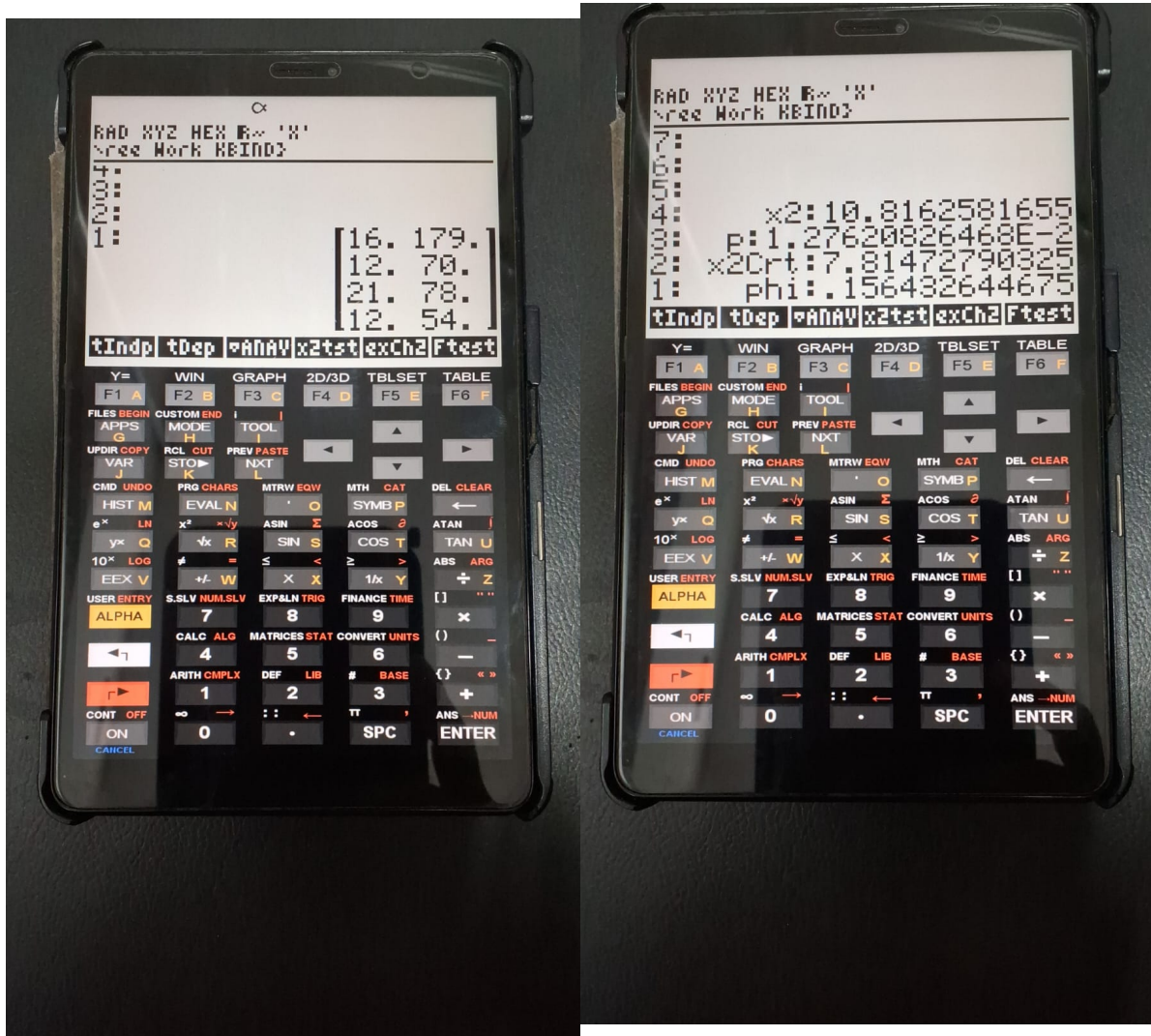
References

1. Vieira, S. *Analysis of Variance: ANOVA*. Atlas Publishing, p. 91, 2000.

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(a) Insertion of the matrix containing table values. (b) Results obtained from the x2test1matrix program.

Figure 1: Stack view of the Android version of the HP50G calculator ([Go49gp](https://www.go49gp.com/)), showing data input and the results of the χ^2 test.