

# SYSTAT 12 - Exact Test 1.0

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### Problem in analyzing small datasets: Try SYSTAT Exact Test

In many fields of application of statistical methods, such as clinical trials and behavioral research, observed data are based on a small sample, are sparse or imbalanced and not particularly amenable to modeling. Therefore, the traditional way of inference, based on the p-value calculated from an asymptotic distribution of the test statistic, may not work in such situations, even if nonparametric methods are used. Parametric inferences pose additional difficulties due to the lack of fulfillment of the strong assumptions about the parent population. All these hurdles in the analysis of data can be easily tackled by exact inference, which involves only simple assumptions about the data source and data behavior.

#### Highlights of SYSTAT Exact Test

Exact tests on ordered and unordered R x C tables  
Exact tests for independent binomial data  
Exact confidence intervals for odds ratios of binomial data

#### Multiple Modes for p-value computation

- The asymptotic value alone (ASYMPTOTIC option);
- The asymptotic value along with the exact p-value (EXACT option);
- The asymptotic p-value along with the Monte Carlo exact value (MC option).

#### SYSTAT Exact Test for You:

SYSTAT provides an extensive set of exact inference procedures through its add-on module, EXACT TESTS 1.0. To support various data types and uses, EXACT TESTS offers a wide variety of test options:

Goodness-of-Fit Tests

Two-Sample Tests

K-Sample Tests

Tests for Single Sample Rates and Proportions

Tests for Binomial Responses

Tests for Association

Use over 30 exact procedures in a familiar SYSTAT interface to:

- Analyze small datasets more accurately
- Breakdown your data into sub-categories
- Analyze rare outcomes in large datasets

Following tests are available with SYSTAT Exact Test 1.0

**Goodness of Fit Test**

**Chi Square**

Compare the sampling distribution with multinomial distribution  
Use Asymptotic, Exact & Exact Using Monte Carlo test type

**Kolmogorov-Smirnov**

Compare the sampling distribution with one of the seven specified distributions

Use Asymptotic, Exact & Exact Using Monte Carlo test type

**2-Sample Test**

**Sign Test**

Compare two related samples using sign test  
Use Asymptotic, Exact & Exact Using Monte Carlo test type

**Wilcoxon Signed Rank Test**

Compare two related samples using Wilcoxon signed-rank test  
Use Asymptotic, Exact & Exact Using Monte Carlo test type

**McNemar Test**

Compare two related samples using McNemar's test  
Use Exact test type.

**Marginal Homogeneity Test**

Compare two related samples using marginal homogeneity test. Both samples should contain equal levels

Use Asymptotic, Exact & Exact Using Monte Carlo test type

**Cohen's Kappa Test**

Test for agreement between two attributes both samples should contain equal levels.

The level of agreement is estimated and corresponding confidence interval is also computed at given level of significance.

Use Asymptotic, Exact & Exact Using Monte Carlo test type

**Wilcoxon-Mann-Whitney**

Test whether the distributions of two independent samples have the same general shape using Wilcoxon-Mann-Whitney test.

Use Asymptotic, Exact & Exact Using Monte Carlo test type

**Logrank Test**

Compare two populations generating survival data with censored observations

Use Asymptotic, Exact & Exact Using Monte Carlo test type

**Kolmogorov-Smirnov Test for 2 samples**

Compare two independent samples with respect to shape and location  
Use Asymptotic, Exact & Exact Using Monte Carlo test type

**Wald-Wolfowitz Runs Test**

Compare two independent samples with respect to shape and location using runs

Use Asymptotic, Exact & Exact Using Monte Carlo test type

**K-Sample Test**

**Friedman Test**

Perform two-way analysis of variance on multiple variables  
Use Asymptotic, Exact & Exact Using Monte Carlo test type

**Quade Test**

Perform two-way analysis of variance on multiple variables  
Use Asymptotic, Exact & Exact Using Monte Carlo test type

**Kendall's Concordance Test**

Capture the relation between correlated data series  
Use Asymptotic, Exact & Exact Using Monte Carlo test type

**Kruskal-Wallis Test**

Perform one-way analysis of variance  
Use Asymptotic, Exact & Exact Using Monte Carlo test type

**ANOVA Test with General Scores**

Perform one-way analysis of variance using general scores  
Use Asymptotic, Exact & Exact Using Monte Carlo test type

**Survival Tests**

Compare multiple samples generated from censored survival data using logrank and Breslow tests

Use Asymptotic, Exact & Exact Using Monte Carlo test type

**Rates & Proportion**

**Binomial Test**

Estimate and test for proportion of successes

**Poisson Test**

Estimate and test for homogeneity of Poisson rates

Use Asymptotic, Exact & Exact Using Monte Carlo test type

**Binomial Responses**

**Odds Ratio of Two Binomial Test**

Test whether the odds ratio is unity. Samples are assumed to be related  
Use Asymptotic & Exact test type

**Two Independent Binomials Test**

Compare two independent binomial proportions using  
Pearson Chi-square Test

**Fisher Exact Test**

**Likelihood Ratio Test**

**Odds ratio Test**

**Test for Association**

**Ordered and Unordered Responses**

Test the association between two attributes Using

**Pearson Correlation Test**

**Spearman Correlation Test**

**Goodman-Kruskal's Gamma Test**

**Kendall's Tau & Somer's D Test**

**Nominal Responses**

Test the association between two attributes using

**Pearson's chi-square Test**

**Goodman-Kruskal's Tau Test**

**Likelihood ratio Test**

**Contingency Coefficients Test**

**Uncertainty Tests**

**Fisherman-Freeman-Halton Test**

Most tests (wherever appropriate) are provided with one- and two-tailed p-values. Based on the nature of test, user can go for their choice

**Testimonial:**

"Congratulations on offering the Fisher-Freeman-Halton exact test on R x C tables... I am delighted to find ANOVA with general scores i.e. a randomization test on means"

Prof. John Ludbrook

Research Fellow

University of Melbourne Department of Surgery

Royal Melbourne Hospital

**Worldwide Offices**

**North, Central & South America**

**Systat Software, Inc.**

225 W. Washington St, Suite 425

Chicago, IL 60606 – 2418

USA

Phone: +

Fax: +1-800-797-7406

Email: info-us@systat.com

Support: techsupport@systat.com

**Europe**

**Systat Software GmbH**

Schimmelbuschstr 25

40699 Erkrath

Germany

Phone: +49-2104-9540

Fax: +49-2104-95410

Email: kontakt@systat.de

Support: eurotechsupport@systat.com

**UK and Ireland**

**Systat Software, Inc. UK Branch Office**

24, Vista Centre, 50 Salisbury Road

Hounslow - TW4 6JQ

London UK

Phone: +44 078 - 77043087

Fax: +44-(0) 208 - 538 0273

Email: ukinfo@systat.com

Support: eurotechsupport@systat.com

**Other Countries**

**Cranes Software International Limited**

4th Floor, Shankar Narayana Building

#25 M.G. Road

Bangalore 560001, India.

Phone: +91-80-4112 0000

Fax: +91-80-4123 1274

Email: indiasales@systat.com

Support: apactechsupport@systat.com