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End Matter

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Visual Fortran Timeline

- 1997** DEC releases Digital Visual Fortran 5.0
- 1998** Compaq acquires DEC and releases DVF 6.0
- 1999** Compaq ships CVF 6.1
- 2001** Compaq ships CVF 6.6
- 2001** Intel acquires CVF engineering team
- 2003** Intel releases Intel Visual Fortran 8.0

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NCSS

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Announcing NCSS 2004 Seventeen New Procedures

NCSS 2004 is a new edition of our popular statistical **NCSS** package that adds seventeen new procedures.

New Procedures

Two Independent Proportions
Two Correlated Proportions
One-Sample Binary Diagnostic Tests
Two-Sample Binary Diagnostic Tests
Paired-Sample Binary Diagnostic Tests
Cluster Sample Binary Diagnostic Tests
Meta-Analysis of Proportions
Meta-Analysis of Correlated Proportions
Meta-Analysis of Means
Meta-Analysis of Hazard Ratios
Curve Fitting
Tolerance Intervals
Comparative Histograms
ROC Curves
Elapsed Time Calculator
T-Test from Means and SD's
Hybrid Appraisal (Feedback) Model

Documentation

The printed, 330-page manual, called *NCSS User's Guide V*, is available for \$29.95. An electronic (pdf) version of the manual is included on the distribution CD and in the Help system.

Two Proportions

Several new exact and asymptotic techniques were added for hypothesis testing (null, noninferiority, equivalence) and calculating confidence intervals for the difference, ratio, and odds ratio. Designs may be independent or paired. Methods include: Farrington & Manning, Gart & Nam, Conditional & Unconditional Exact, Wilson's Score, Miettinen & Nurminen, and Chen.

Meta-Analysis

Procedures for combining studies measuring paired proportions, means, independent proportions, and hazard ratios are available. Plots include the forest plot, radial plot, and L'Abbe plot. Both fixed and random effects models are available for combining the results.

Curve Fitting

This procedure combines several of our curve fitting programs into one module. It adds many new models such as Michaelis-Menten. It analyzes curves from several groups. It compares fitted models across groups using computer-intensive randomization tests. It computes bootstrap confidence intervals.

Tolerance Intervals

This procedure calculates one and two sided tolerance intervals using both distribution-free (nonparametric) methods and normal distribution (parametric) methods. Tolerance intervals are bounds between which a given percentage of a population falls.

Comparative Histogram

This procedure displays a comparative histogram created by interspersing or overlaying the individual histograms of two or more groups or variables. This allows the direct comparison of the distributions of several groups.

Random Number Generator

Matsumoto's Mersenne Twister random number generator (cycle length > 10**6000) has been implemented.

Binary Diagnostic Tests

Four new procedures provide the specialized analysis necessary for diagnostic testing with binary outcome data. These provide appropriate specificity and sensitivity output. Four experimental designs can be analyzed including independent or paired groups, comparison with a gold standard, and cluster randomized.

ROC Curves

This procedure generates both binormal and empirical (nonparametric) ROC curves. It computes comparative measures such as the whole, and partial, area under the ROC curve. It provides statistical tests comparing the AUC's and partial AUC's for paired and independent sample designs.

Hybrid (Feedback) Model

This new edition of our hybrid appraisal model fitting program includes several new optimization methods for calibrating parameters including a new genetic algorithm. Model specification is easier. Binary variables are automatically generated from class variables.

Statistical Innovations Products

Through a *special arrangement* with Statistical Innovations (S.I.), NCSS customers will receive \$100 discounts on:

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Forest Plot of Odds Ratio

Statistical and Graphics Procedures Available in NCSS 2004

Analysis of Variance / T-Tests

Analysis of Covariance
Analysis of Variance
Bartlett Variance Test
Crossover Design Analysis
Factorial Design Analysis
Friedman Test
Geiser-Greenhouse Correction
General Linear Models
Mann-Whitney Test
MANOVA
Multiple Comparison Tests
One-Way ANOVA
Paired T-Tests
Power Calculations
Repeated Measures ANOVA
T-Tests – One or Two Groups
T-Tests – From Means & SD's
Wilcoxon Test

Time Series Analysis

ARIMA / Box - Jenkins
Decomposition
Exponential Smoothing
Harmonic Analysis
Holt - Winters
Seasonal Analysis
Spectral Analysis
Trend Analysis

Plots / Graphs

Bar Charts
Box Plots
Contour Plot
Dot Plots
Error Bar Charts
Histograms
Histograms: Combined*
Percentile Plots
Pie Charts
Probability Plots
ROC Curves*
Scatter Plots
Scatter Plot Matrix
Surface Plots
Violin Plots

Experimental Designs

Balanced Inc. Block
Box-Behnken
Central Composite
D-Optimal Designs
Fractional Factorial
Latin Squares
Plackett-Burman
Response Surface
Screening
Taguchi

Regression / Correlation

All-Possible Search
Canonical Correlation
Correlation Matrices
Cox Regression
Kendall's Tau Correlation
Linear Regression
Logistic Regression
Multiple Regression
Nonlinear Regression
PC Regression
Poisson Regression
Response-Surface
Ridge Regression
Robust Regression
Stepwise Regression
Spearman Correlation
Variable Selection

Quality Control

Xbar-R Chart
C, P, NP, U Charts
Capability Analysis
Cusum, EWMA Chart
Individuals Chart
Moving Average Chart
Pareto Chart
R & R Studies

Survival / Reliability

Accelerated Life Tests
Cox Regression
Cumulative Incidence
Exponential Fitting
Extreme-Value Fitting
Hazard Rates
Kaplan-Meier Curves
Life-Table Analysis
Lognormal Fitting
Log-Rank Tests
Probit Analysis
Proportional-Hazards
Reliability Analysis
Survival Distributions
Time Calculator*
Weibull Analysis

Multivariate Analysis

Cluster Analysis
Correspondence Analysis
Discriminant Analysis
Factor Analysis
Hotelling's T-Squared
Item Analysis
Item Response Analysis
Loglinear Models
MANOVA
Multi-Way Tables
Multidimensional Scaling
Principal Components

Curve Fitting

Bootstrap C.I.'s*
Built-In Models
Group Fitting and Testing*
Model Searching
Nonlinear Regression
Randomization Tests*
Ratio of Polynomials
User-Specified Models

Miscellaneous

Area Under Curve
Bootstrapping
Chi-Square Test
Confidence Limits
Cross Tabulation
Data Screening
Fisher's Exact Test
Frequency Distributions
Mantel-Haenszel Test
Nonparametric Tests
Normality Tests
Probability Calculator
Proportion Tests
Randomization Tests
Tables of Means, Etc.
Trimmed Means
Univariate Statistics

Meta-Analysis*

Independent Proportions*
Correlated Proportions*
Hazard Ratios*
Means*

Binary Diagnostic Tests*

One Sample*
Two Samples*
Paired Samples*
Clustered Samples*

Proportions

Tolerance Intervals*
Two Independent*
Two Correlated*
Exact Tests*
Exact Confidence Intervals*
Farrington-Manning*
Fisher Exact Test
Gart-Nam* Method
McNemar Test
Miettinen-Nurminen*
Wilson's Score* Method
Equivalence Tests*
Noninferiority Tests*

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PASS is a standalone system. Although it is integrated with *NCSS*, you do not have to own *NCSS* to run it. You can use it with any statistical software you want.

PASS comes with two manuals that contain tutorials, examples, annotated output, references, formulas, verification, and complete instructions on each procedure. And, if you cannot find an answer in the manual, our free technical support staff (which includes a PhD statistician) is available.

System Requirements

PASS runs on Windows 95/98/ME/NT/2000/XP with at least 32 megs of RAM and 30 megs of hard disk space.

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No other program calculates sample sizes and power for as many different statistical procedures as does *PASS*.

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Geisser-Greenhouse
MANOVA*
Multiple Comparisons*
One-Way AOV
Planned Comparisons
Randomized Block AOV
New Repeated Measures AOV*

Regression / Correlation

Correlations (one or two)
Cox Regression*
Logistic Regression
Multiple Regression
Poisson Regression*
Intraclass Correlation
Linear Regression

Proportions

Chi-Square Test
Confidence Interval
Equivalence of McNemar*
Equivalence of Proportions
Fisher's Exact Test
Group Sequential Proportions
Matched Case-Control
McNemar Test
Odds Ratio Estimator
One-Stage Designs*
Proportions – 1 or 2
Two Stage Designs (Simon's)
Three-Stage Designs*

Miscellaneous Tests

Exponential Means – 1 or 2*
ROC Curves – 1 or 2*
Variances – 1 or 2

T Tests

Cluster Randomization
Confidence Intervals
Equivalence T Tests
Hotelling's T-Squared*
Group Sequential T Tests
Mann-Whitney Test
One-Sample T-Tests
Paired T-Tests
Standard Deviation Estimator
Two-Sample T-Tests
Wilcoxon Test

Survival Analysis

Cox Regression*
Logrank Survival - Simple
Logrank Survival - Advanced*
Group Sequential - Survival
Post-Marketing Surveillance
ROC Curves – 1 or 2*

Group Sequential Tests

Alpha Spending Functions
Lan-DeMets Approach
Means
Proportions
Survival Curves

Equivalence

Means
Proportions
Correlated Proportions*

Miscellaneous Features

Automatic Graphics
Finite Population Corrections
Solves for any parameter
Text Summary
Unequal N's

***New in PASS 2002**

PASS 2002 adds power analysis and sample size to your statistical toolbox

WHAT'S NEW IN PASS 2002?

Thirteen new procedures have been added to *PASS* as well as a new home-base window and a new Guide Me facility.

MANY NEW PROCEDURES

The new procedures include a new multi-factor repeated measures program that includes multivariate tests, Cox proportional hazards regression, Poisson regression, MANOVA, equivalence testing when proportions are correlated, multiple comparisons, ROC curves, and Hotelling's T-squared.

TEXT STATEMENTS

The text output translates the numeric output into easy-to-understand sentences. These statements may be transferred directly into your grant proposals and reports.

GRAPHICS

The creation of charts and graphs is easy in *PASS*. These charts are easily transferred into other programs such as MS PowerPoint and MS Word.

NEW USER'S GUIDE II

A new, 250-page manual describes each new procedure in detail. Each chapter contains explanations, formulas, examples, and accuracy verification.

The complete manual is stored in PDF format on the CD so that you can read and printout your own copy.

GUIDE ME

The new *Guide Me* facility makes it easy for first time users to enter parameter values. The program literally steps you through those options that are necessary for the sample size calculation.

NEW HOME BASE

A new home base window has been added just for *PASS* users. This window helps you select the appropriate program module.

COX REGRESSION

A new Cox regression procedure has been added to perform power analysis and sample size calculation for this important statistical technique.

REPEATED MEASURES

A new repeated-measures analysis module has been added that lets you analyze designs with up to three grouping factors and up to three repeated factors. The analysis includes both the univariate F test and three common multivariate tests including Wilks Lambda.

RECENT REVIEW

In a recent review, 17 of 19 reviewers selected *PASS* as the program they would recommend to their colleagues.

PASS calculates sample sizes for...

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The new GGUM2004 software system estimates parameters in a family of item response theory (IRT) models that unfold polytomous responses to questionnaire items. These models assume that persons and items can be jointly represented as locations on a latent unidimensional continuum. A single-peaked, nonmonotonic response function is the key feature that distinguishes unfolding IRT models from traditional, "cumulative" IRT models. This response function suggests

that a higher item score is more likely to the extent that an individual is located close to a given item on the underlying continuum. Such single-peaked functions are appropriate in many situations including attitude measurement with Likert or Thurstone scales, and preference measurement with stimulus rating scales. This family of models can also be used to determine the locations of respondents in particular developmental processes that occur in stages.

The GGUM2004 system estimates item parameters using marginal maximum likelihood, and person parameters are estimated using an expected *a posteriori* (EAP) technique. The program allows for up to 100 items with 2-10 response categories per item, and up to 2000 respondents. GGUM2004 is compatible with computers running updated versions of Windows 98 SE, Windows 2000, and Windows XP. The software is accompanied by a detailed technical reference manual and a new Windows user's guide. **GGUM2004 is free** and can be downloaded from:

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GGUM2004 improves upon its predecessor (GGUM2000) in several important ways:

- It has a user-friendly graphical interface for running commands and displaying output.
- It offers real-time graphics that characterize the performance of a given model.
- It provides new item fit indices with desirable statistical characteristics.
- It allows for missing item responses assuming the data are missing at random.
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- It estimates model parameters more quickly.

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In addition to its speed even when one sample is large, some of the unique and powerful features of PermuteltTM include:

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- extremely fast exact inference (no confidence intervals – just exact p-values) for most count data and high-frequency continuous data, often several orders of magnitude faster than the most widely available commercial alternative
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- fast, efficient, and automatic generation of all pairwise comparisons
- efficient variance-reduction under conventional Monte Carlo via self-adjusting permutation sampling when confidence intervals contain the user-specified critical value of the test
- maximum power, and the shortest confidence intervals, under conventional Monte Carlo via a new sampling optimization technique (see Opdyke, JMASM, Vol. 2, No. 1, May, 2003)
- fast permutation-style p-value adjustments for multiple comparisons (the code is designed to provide an additional speed premium for many of these resampling-based multiple testing procedures)
- simultaneous permutation testing and permutation-style p-value adjustment, although for relatively few tests at a time (this capability is not even provided as a preprogrammed option with any other software currently on the market)

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DataMineltSM is a technical consultancy providing statistical data mining, econometric analysis, and data warehousing services and expertise to the industry, consulting, and research sectors. PermuteltTM is its flagship product.

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```
ELSE
  poly_coefficient
END IF
ELSE
  poly_coefficient
END IF
END FUNCTION poly_c
SUBROUTINE poly_init
  TYPE(poly), INTENT
  REAL(fpkind), INTE
  IF ( .NOT. PRESENT
    NULLIFY ( p%coef
  ELSE
    m = UBOUND(v,l)
    IF ( max_degree
      ALLOCATE ( p%
      p%coeffs
    ELSE
      ALLOCATE ( p%
      p%coeffs
    END IF
  END IF
```

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