Overview

SAS/STAT 13.1 introduces three new procedures to SAS users and provides key enhancements to many existing statistical procedures. Available with Base SAS 9.4M1, this release adds important new functionality to SAS statistical software.

Bayesian Choice Modeling

The experimental BCHOICE procedure performs Bayesian analysis for discrete choice models. Discrete choice models are used in marketing research to model decision makers’ choices among alternative products and services. The decision makers might be people, households, companies, and so on, and the alternatives might be products, services, actions, or any other options or items about which choices must be made. The collection of alternatives is known as a choice set, and when individuals are asked to choose, they usually assign a utility to each alternative.

The BCHOICE procedure provides Bayesian discrete choice models such as the multinomial logit, multinomial logit with random effects, and the nested logit. You can supply a prior distribution for the parameters if you want something other than the default noninformative prior. PROC BCHOICE obtains samples from the corresponding posterior distributions, produces summary and diagnostic statistics, and saves the posterior samples to an output data set that can be used for further analysis.

Analyzing Interval-Censored Data

The ICLIFETEST procedure performs nonparametric survival analysis for interval-censored data. You can use the ICLIFETEST procedure to compute nonparametric estimates of survival functions and to examine the equality of survival functions via statistical tests. PROC ICLIFETEST uses either a multiple imputation method or a bootstrap method to compute the standard errors of the survival estimates. It supports several transformation-based confidence intervals and produces survival plots.

PROC ICLIFETEST provides the following:

- weighted generalized log-rank test
- weight functions for testing early or late differences
- stratified test for survival differences within predefined populations
- trend test for ordered alternatives
- multiple comparisons

Competing-Risks Model

The competing-risks model of Fine and Gray is now available in the PHREG procedure. Competing risks arise in the analysis of time-to-event data when the event of interest can be impeded by a prior event of a different type. In the presence of competing risks, the Kaplan-Meier method of estimating the survivor function is biased because you can no longer assume that a subject will experience the event of interest if the follow-up period is long enough. The proportional hazards model of Fine and Gray focuses on modeling the cumulative incidence of the event of interest.
**Item Response Theory Models**

The experimental IRT procedure fits item response theory models. These models are widely used in education to calibrate and evaluate items in tests, questionnaires, and other instruments; they are used to score subjects on their abilities, attitudes, and other latent traits. In recent years, IRT models have also become increasingly popular in health behavior, quality of life, and clinical research.

PROC IRT supports several response models for binary and ordinal responses, including Rasch models; one-, two-, three-, and four-parameter models; and graded response models with a logistic or probit link. PROC IRT also does the following:

- enables different items to have different response models
- performs multidimensional exploratory and confirmatory analysis
- performs multiple-group analysis
- estimates factor scores

**Sensitivity Analysis**

Missing data strategies are an important component of data analysis today. You can now evaluate how departures from the missing at random (MAR) assumption affect your inferences by using the new MNAR statement in the MI procedure, which imputes missing values by taking the pattern-mixture approach and assuming MNAR (missing not at random). By comparing inferential results for the latter values to results imputed under MAR, you can assess the sensitivity of your analysis to the MAR assumption.

**Other Highlights**

Other enhancements include the following:

- The GENMOD procedure now supports the Tweedie distribution.
- The NLIN procedure generates both bootstrap estimates of confidence intervals for the parameters and bootstrap estimates of the covariance matrix and correlation matrix of the parameter estimates.
- The SURVEYMEANS procedure produces domain quantile estimates.
- You can now compute power for PROC GLM–type MANOVA and repeated measurements with the GLMPOWER procedure.
- The CALIS procedure produces path diagrams.

For More Information

SAS/STAT 12.3 was the first SAS release available with Base SAS 9.4. It introduced the HPGENSELECT procedure for selection of generalized linear models. For complete information about all SAS/STAT releases, see the documentation, particularly the What’s New chapters, available at support.sas.com/stat/.