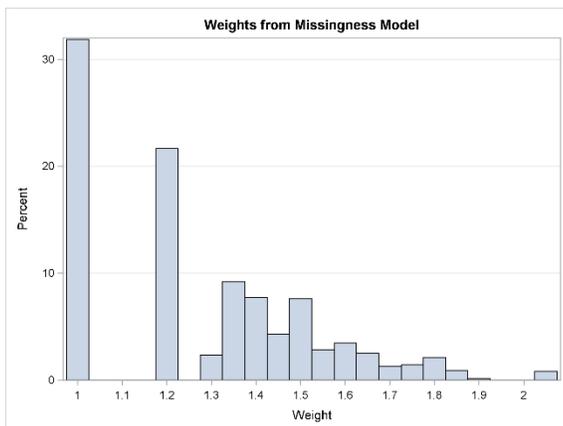


## Overview

SAS/STAT 13.2 introduces three new procedures and adds new features to many existing analyses. This release is available with the second maintenance release for Base SAS® 9.4.

## Weighted Generalized Estimating Equations

The experimental GEE procedure fits models to longitudinal data by using the generalized estimating equations (GEE) method of Liang and Zeger (1986). It also provides the weighted estimated equation method for handling missing data, which assumes the data are missing at random (MAR). The GEE procedure uses syntax similar to that provided by the GENMOD procedure for fitting GEE models.

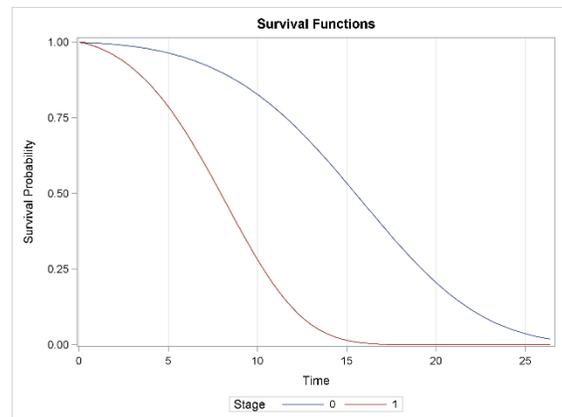


PROC GEE implements observation-specific and subject-specific weighted estimating equations. Both weighted estimators provide unbiased and consistent estimates when data are missing at random. The first release of the GEE procedure does not provide the multinomial distribution for polytomous responses, the CLOGIT or GLOGIT link functions, or diagnostics.

## Survival Analysis for Interval-Censored Data

The ICLIFETEST procedure for estimating nonparametric survival functions for interval-censored data was introduced in SAS/STAT13.1.

This release introduces the ICPHREG procedure for fitting proportional hazards regression models to interval-censored data. You can fit models that have a variety of configurations with respect to the baseline hazard function, including the piecewise constant model and the cubic spline model. PROC ICPHREG maximizes the full likelihood instead of the Cox partial likelihood to estimate the regression coefficients. Standard errors of the estimates are obtained by inverting the observed information matrix that is derived from the full likelihood.



The ICPHREG procedure compares most closely to the PHREG and LIFEREG procedures. All three procedures can fit proportional hazards models. The distinction lies in the types of data that they are designed to handle and whether the baseline hazard function is parameterized. PROC PHREG deals exclusively with right-censored data, and it adopts a semiparametric approach by leaving the baseline hazard function unspecified. Both PROC LIFEREG and PROC ICPHREG can handle interval-censored data, which is a generalization of right-censored data. PROC LIFEREG focuses on parametric analysis by using accelerated failure time models, and it fits proportional hazards models only by assuming a Weibull baseline hazard function. PROC ICPHREG offers several options to parameterize the baseline hazard function. PROC ICPHREG generalizes PROC LIFEREG to fit more flexible parametric models and also generalizes PROC PHREG to handle interval-censored data.

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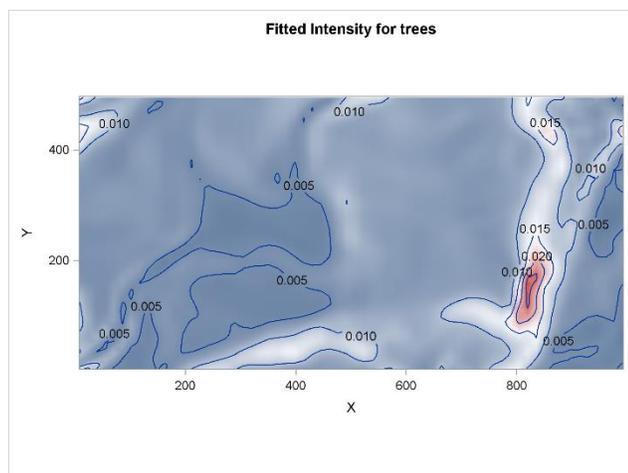
## Spatial Point Pattern Analysis

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The goal of spatial point pattern analysis is to describe the occurrence of events (observations) that compose the pattern. The event locations are a discrete realization of a random spatial process. The analysis goal is to investigate and characterize the original spatial process that generated the events in the spatial point pattern.

The new SPP procedure analyzes spatial point patterns. It enables you to specify the study area as a window, or you can rely on the input data coordinates to automatically compute a suitable study area by using the Ripley-Rasson window estimator. You can perform exploratory analysis of spatial point patterns by using the F, G, J, K, L, and PCF distance functions, which compare the empirical function distributions to the theoretical homogeneous Poisson process. PROC SPP provides:

- nonparametric intensity estimation by using different types of kernels
- adaptive kernel estimation
- parametric inhomogeneous Poisson process models to perform model validation



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## Item Response Models

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The IRT procedure for fitting item response models is now production. You can now request the polychoric correlation matrix in addition to its heat map, item characteristic curves, and test information curve plots.

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## Bayesian Choice Models

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The BCHOICE procedure for fitting Bayesian choice models is now production and includes an improved Gamerman sampling algorithm that provides faster performance.

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## Other Enhancements

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- The FMM procedure fits multinomial data, including the multinomial cluster distribution for modeling multinomial overdispersion.
- The FACTOR procedure generates path diagrams.
- The MCMC procedure supports a categorical distribution in the MODEL, RANDOM, and PRIOR statements.
- The NLMIXED procedure enables you to specify more than one RANDOM statement in order to fit hierarchical nonlinear mixed models.
- The SEQDESIGN procedure enables you to create a ceiling-adjusted design that corresponds to integer-valued sample sizes at the stages for nonsurvival data.
- The LOGISTIC procedure enables you to add or relax constraints on parameters in nominal response models and partial proportional odds models.
- The FREQ procedure now provides score confidence limits for the odds ratio and the relative risk.
- The GLMSELECT procedure supports screening methods that markedly improve performance by reducing the number of regressors for which model selection is performed. Both safe screening and sure independence screening are available.

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## For More Information

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SAS/STAT 13.2 is now available. For complete information about all SAS/STAT releases, see the documentation at [support.sas.com/stat/](http://support.sas.com/stat/).