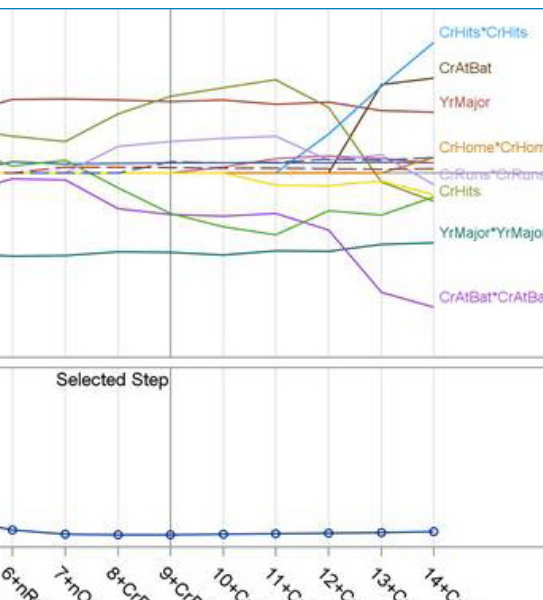


# SAS/STAT® Software



## What does SAS/STAT® do?

From analysis of variance and linear regression to Bayesian inference and high-performance modeling tools for massive data, SAS/STAT software provides tools for both specialized and enterprisewide statistical needs.

## Why is SAS/STAT® important?

Organizations of all types and sizes depend on statistical analysis to guide critical decisions. Modern statistical methods provide trustworthy evidence for creating effective treatments for disease, improving manufacturing processes, predicting customer behavior and making policy decisions. SAS/STAT provides a comprehensive set of up-to-date tools that can meet the data analysis needs of your entire organization.

## For whom is SAS/STAT® designed?

It is designed for use by business analysts, statisticians, data scientists, researchers and engineers.

Organizations in every field depend on data and analysis to provide new insights, gain competitive advantage and make informed decisions. For many organizations, the complexity and volume of their data has outgrown the capabilities of other statistical software.

SAS/STAT software provides extensive statistical capabilities that scale to meet the expanding requirements of specialized and enterprisewide analysis.

Whether you want to perform a customer preference study, analyze the results of clinical trials, predict credit card usage patterns, model air pollution patterns or design a health behavior survey, SAS/STAT is the software of choice.

And because SAS remains committed to its long tradition of constantly enriching its statistical offerings, you'll continue to have the most up-to-date statistical techniques.

## Benefits

- Apply the latest statistical techniques.** With an accelerated release schedule, SAS/STAT keeps up with new methods emerging from the rapidly expanding field of statistics.
- Analyze any kind and size of data.** SAS/STAT includes exact techniques for small data sets, high-performance statistical modeling tools for large-data tasks and modern methods for analyzing data with missing values.
- Readily understand results with a wealth of graphs.** SAS/STAT output provides hundreds of built-in, customizable graphs that are designed for a consistent look across analyses.
- Take advantage of our technical support and web user communities.** Backed by industry-leading statistical technical support, SAS/STAT software is the complete answer to a broad spectrum of statistical needs.
- Use proven and validated methods.** SAS has decades of experience developing advanced statistical analysis software designed for superior, reliable results. A rigorous software testing and quality assurance program means you can count on the quality of each release. With SAS/STAT, you can produce code that is documented and verified for corporate and governmental compliance requirements.

## Overview

Statistics is a rapidly expanding discipline, and SAS/STAT is keeping pace. An accelerated release schedule delivers more state-of-the-art statistical methods and high-performance computational tools, along with user-requested enhancements. SAS/STAT software provides the foundation for many SAS Analytic offerings. It delivers a complete, comprehensive set of statistical tools that can meet the data analysis requirements of your entire organization.

### Expansive library of ready-to-use statistical procedures

With SAS/STAT, you get more than 90 prewritten procedures for statistical analysis. These procedures encapsulate and deliver significant functionality that can be executed with just a few simple commands, enabling programmers to be more efficient and productive. This wide range of robust statistical methods can help you solve your most complicated business and scientific problems, such as uncovering new information for improving processes, driving development and revenues and retaining valued and satisfied customers.

### Highly interpretable statistical output

Clarity and consistency of statistical output, including a wealth of built-in graphs, enable users to readily understand analysis results.

### Comprehensive documentation and training

Extensive online documentation, including a rich set of introductory examples, allows users to get up and running with the software quickly and effectively. Free "how to" videos, tutorials and demos help you build your knowledge of statistical methods and learn how to apply SAS/STAT in your work.

### Cross-platform support and scalability

SAS runs on all major computing platforms and can access nearly any data source. The technology easily integrates into any organization's computing environment and can scale as you face larger or more complex analytical problems.

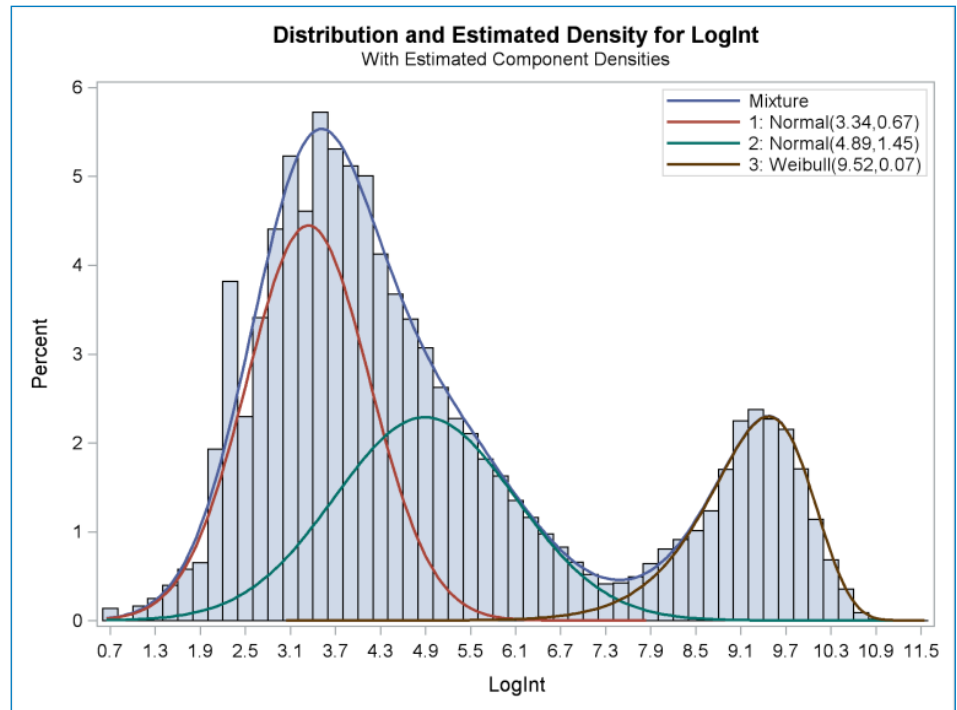


Figure 1: Plot of component densities for a finite mixture model created with the FMM procedure.

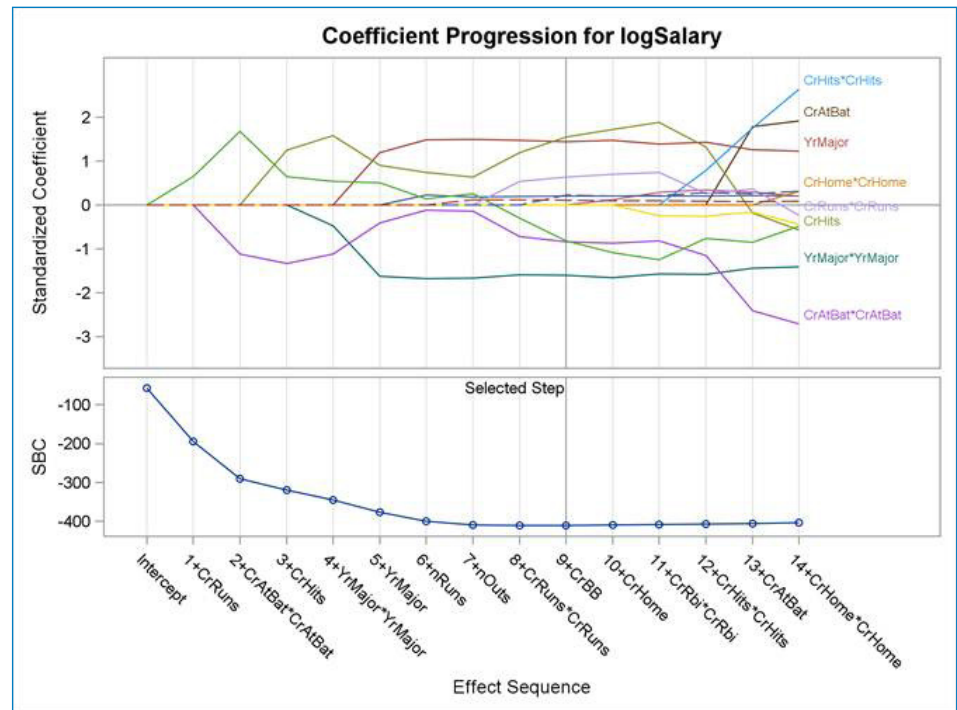


Figure 2: A model-building progress plot created with the GLMSELECT procedure.

# Key Features

## Analysis of Variance

- Balanced and unbalanced designs.
- Multivariate analysis of variance and repeated measurements.
- Linear models.
- More [analysis of variance](#) capabilities.

## Bayesian Analysis

- Built-in Bayesian modeling and inference for generalized linear models, accelerated failure time models, Cox regression models and finite mixture models.
- Wide range of Bayesian models available via general-purpose MCMC simulation procedure.
- Bayesian discrete choice modeling.
- More [Bayesian analysis](#) capabilities.

## Categorical Data Analysis

- Contingency tables and measures of association.
- Bioassay analysis.
- Generalized linear models.
- More [categorical data analysis](#) capabilities.

## Causal Inference

- Propensity score analysis.
- Estimation of causal treatment effects.

## Cluster Analysis

- Hierarchical clustering of multivariate data or distance data.
- Disjoint clustering of large data sets.
- Nonparametric clustering with hypothesis tests for the number of clusters.
- More [cluster analysis](#) capabilities.

## Descriptive Statistics

- Box-and-whisker plots.
- Compute directly and indirectly standardized rates and risks for study populations.
- More [descriptive statistics](#) capabilities.

## Discriminant Analysis

- Canonical discriminant analysis.

- Stepwise discriminant analysis.
- More [discriminant analysis](#) capabilities.

## Distribution Analysis

- Univariate and bivariate kernel density estimation.
- More [distribution analysis](#) capabilities.

## Exact Inference

- Exact p-values and confidence intervals for many test statistics and measures based on one-way and n-way frequency tables.
- Exact tests for the parameters of a logistic regression model.
- Exact tests for the parameters of a Poisson regression model.
- More [exact methods](#) capabilities.

## Finite Mixture Models

- Modeling of component distributions and mixing probabilities.
- Maximum likelihood and Bayesian methods.
- More [finite mixture](#) capabilities.

## Group Sequential Design and Analysis

- Design of interim analyses.
- Perform interim analyses.
- More on [group sequential design and analysis](#) capabilities.

## Longitudinal Data Analysis

- Marginal and mixed models.
- Continuous and categorical outcomes.
- More [longitudinal data analysis](#) capabilities.

## Market Research

- Simple and multiple correspondence analysis.
- Two-way and three-way metric and nonmetric multidimensional scaling models.
- Discrete choice models.
- More [market research](#) capabilities.

## Missing Data Analysis

- Multiple imputation.
- Weighted generalized estimating equations.
- Imputation for survey data.
- More [missing data analysis](#) capabilities.

## Mixed Models

- Linear and nonlinear mixed models.
- Generalized linear mixed models.
- Nested models.
- More [mixed models](#) capabilities.

## Model Selection

- Linear models.
- Generalized linear models.
- Quantile regression models.
- More [model selection](#) capabilities.

## Multivariate Analysis

- Exploratory and confirmatory factor analysis.
- Principal components analysis.
- Canonical correlation and partial canonical correlation.
- More [multivariate analysis](#) capabilities.

## Nonlinear Regression

- Automatic derivatives.
- Bootstrapped confidence intervals.
- More [nonlinear regression](#) capabilities.

## Nonparametric Analysis

- Kruskal-Wallis, Wilcoxon-Mann-Whitney and Friedman tests.
- Other rank tests for balanced or unbalanced one-way or two-way designs.
- Exact probabilities for many nonparametric statistics.
- More [nonparametric analysis](#) capabilities.

## Nonparametric Regression

- Multivariate adaptive regression splines.
- Generalized additive models.
- Local regression.

## Key Features (continued)

- Thin-plate smoothing splines.
- More [nonparametric regression](#) capabilities.

### Power and Sample Size

- Computations for linear models including MANOVA repeated measurements.
- Computations for many hypothesis tests, equivalence tests and correlation analysis.
- Computations for binary logistic regression and survival analysis.
- More [power and sample size](#) capabilities.

### Post Processing

- Hypothesis tests.
- Prediction plots.
- Scoring.
- More [post-processing](#) capabilities.

### Predictive Modeling

- Classification and regression trees.
- Partitioning of data into training, validation and testing roles.
- Modern model selection methods such as elastic net and group LASSO.
- More [predictive modeling](#) capabilities.

### Psychometric Analysis

- Multidimensional scaling.
- Conjoint analysis with variable transformations.
- Item response theory (IRT) models.
- More [psychometric analysis](#) capabilities.

### Quantile Regression

- Simplex, interior point and smoothing algorithms.
- Analysis of censored data.
- Model selection for linear regression models.
- More [quantile regression](#) capabilities.

### Regression

- Least squares regression.
- Principal components regression.
- Quadratic response surface models.
- Accurate estimation for ill-conditioned data.
- More [regression](#) capabilities.

### Robust Regression

- M estimation and high-breakdown methods.
- Outlier diagnostics.
- More [robust regression](#) capabilities.

### Spatial Analysis

- Ordinary kriging in two dimensions.
- Spatial point pattern analysis.
- Variogram diagnostics.
- More [spatial analysis](#) capabilities.

### Standardization

- 18 standardization methods.
- More [standardization](#) capabilities.

### Structural Equations

- Structural equation models specified with popular modeling languages.
- Parameter estimation and hypothesis testing for constrained and unconstrained problems.
- More [structural equation](#) capabilities.

### Survey Sampling and Analysis

- Sample selection.
- Descriptive statistics.
- Linear and logistic regression.
- Proportional hazards regression.
- Missing value imputation.
- More survey [sampling and analysis](#) capabilities.

### Survival Analysis

- Nonparametric survival function estimates.
- Competing-risk models.
- Accelerated failure time models.
- Proportional hazards models.
- Interval-censored data analysis.
- More [survival analysis](#) capabilities.

### High Performance

- 14 SAS/STAT procedures are multithreaded.
- 12 SAS® [High-Performance Statistics procedures](#) are available with SAS/STAT for single machine use.

### Statistical Graphics

- Hundreds of statistical graphs available with analyses.
- Customization provided.
- Base SAS "SG" procedures create user-specified statistical graphics.
- More [statistical graphics](#) capabilities.

## TO LEARN MORE »

To learn more about SAS/STAT, download white papers, view screenshots and see other related material, please visit [sas.com/stat](http://sas.com/stat).

To contact your local SAS office, please visit: [sas.com/offices](http://sas.com/offices)

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