

# > Improve Your Forecasts With Time-series Data Analysis

Time-series analysis is the most powerful procedure you can use to analyze historical information, build models, and predict trends. Whatever data you examine—sales figures, student enrollments, or crime rates—answers are just mouseclicks away with SPSS Trends. Its easy-to-use graphical interface makes specifying your analysis simple. Use SPSS Trends for many tasks, including:

- Production management—Monitor quality standards
- Data processing—Manage forecasting systems performance
- Budget management—Run sales forecasts
- Public policy research—Study public opinion

## In-depth modeling support at every stage

SPSS Trends provides flexible alternatives for every stage of model building, so you arrive at the best possible solution. To help you identify an appropriate model, SPSS Trends generates a variety of graphs for that important first view of your data.

Select from advanced estimation procedures in SPSS Trends:

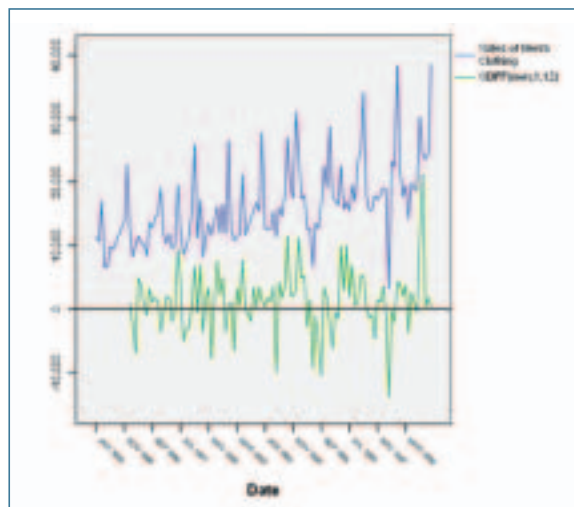
- Use Box-Jenkins analysis for nonseasonal and univariate models
- Access procedures for handling seasonal factors
- Estimate up to four parameters in 12 different models for exponential smoothing
- Use different regression methods—Trend regressions and regression models with first-order autoregressive errors
- Decompose a time series into its harmonic components

## Check the fit of your models with rich diagnostics

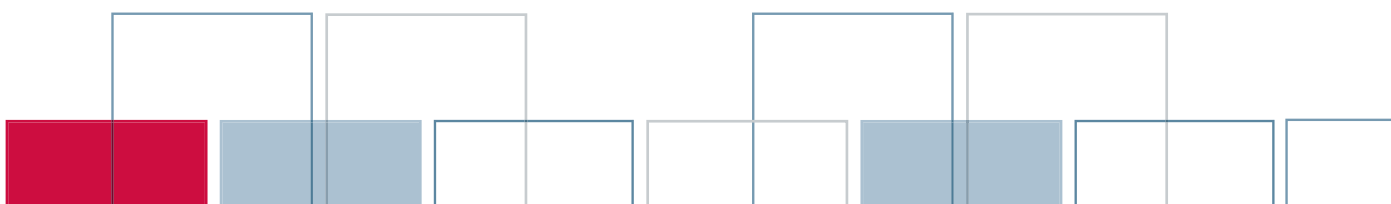
SPSS Trends generates statistics and normal probability plots to assess how models fit your data. Easily judge fit with automatically created standard errors and other statistics. Enhance your output with automatic, high-resolution charts created upon your request. When you generate goodness-of-fit statistics, the display automatically separates the statistics for historical and validation periods so you see them side by side.

## Make your analysis easier

SPSS Trends gives you complete and flexible time-series tools with a simple and easy-to-use graphical interface. Fine tune or adjust your analysis in just a few mouseclicks with dialog boxes that guide you through every step.



This data chart illustrates men's clothing sales, raw and seasonally differenced over a 10-year period. Using seasonal difference helps to clarify the relationships within your data.



# Features

## Procedures

### ARIMA

Produces maximum likelihood estimates for seasonal and non-seasonal univariate models

- Exact maximum likelihood method
- General or constrained models specified by auto-regressive or moving average order, order of differencing, seasonal autoregressive or moving average order, and seasonal differencing
- Initial values can be user specified or calculated automatically
- Specify confidence interval level
- Allows embedded missing values in a series
- Performs intervention analysis

### EXSMOOTH

Uses exponential smoothing methods to estimate up to four parameters for your choice of 12 available models

- Models within any combination of trend and seasonality components: Constant, linear, exponential, or damped trend, each with no seasonality, additive seasonal, or multiplicative seasonal component
- Smoothing parameters: General, trend, seasonal, and dampening
- Specify periodicity, initial seasonal factor, and initial general and trend values used in the model

### SEASON

Estimates multiplicative or additive seasonal factors for periodic time series

- Multiplicative or additive model
- Moving averages, ratios, seasonal and seasonal adjustment factors, seasonally adjusted series, smoothed trend-cycle components, and irregular components

### SPECTRA

Decomposes a time series into its harmonic components, a set of regular periodic functions at different wavelengths or periods

- Produces/plots univariate or bivariate periodogram and spectral density estimate
- Bivariate spectral analysis
- Smooth periodogram values with weighted moving averages
- Spectral data windows available for smoothing: Tukey-Hamming, Tukey, Parzen, Bartlett, equal weight, no smoothing, and user-specified weights
- High-resolution charts available: Periodogram, spectral and cospectral density estimate, squared coherency, quadrature spectrum estimate, phase spectrum, cross amplitude, and gain

### AREG

Estimates a regression model when the error from the regression is correlated between one time point and the next

- Estimation techniques: Prais-Winsten, Cochrane-Orcutt, and exact maximum-likelihood method
- Temporary variables labeled or added to active file: Fitted values, residuals, standard errors of prediction, and lower and upper confidence limits
- Statistics available: Rho values and statistics at each iteration, adjusted sum of squares, Marquardt constant, final parameter estimates, regression statistics, correlation and covariance matrices, Akaike's information criterion, and Schwartz's Bayesian criterion

### System requirements

- Software: SPSS Base 13.0
- Minimum free drive space: 1MB
- Other system requirements vary according to platform

*Features subject to change based on final product release.*

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