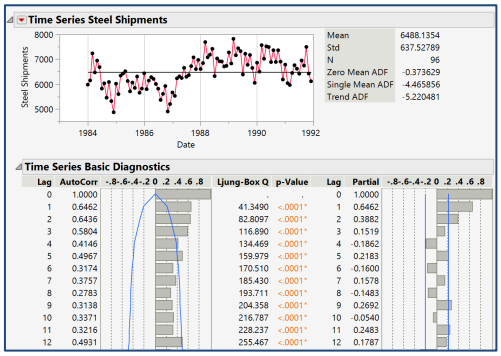
ARIMA Modeling

Use ARIMA (Auto Regressive Integrated Moving Average) time series models to examine autocorrelation, describe patterns (trends and seasonality), and forecast future time periods.

ARIMA Modeling

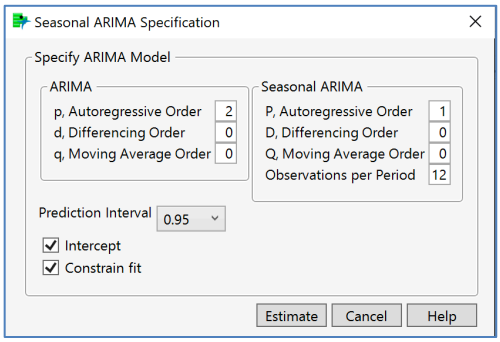
Steel Shipments.jmp (Help > Sample Data Folder > Time Series)



1. From an open JMP® data table, select **Analyze > Specialized Modeling > Time Series**.
2. Select a continuous variable from **Select Columns**, and click **Y, Time Series** (continuous variables have blue triangles).
3. Select a time variable and click **X, Time ID** (*optional*). Click **OK**.
   Note: Data must be sorted by time and equally spaced. If no time variable is used, JMP will assume equal spacing.

   The autocorrelation (ACF) and partial autocorrelation (PACF) plots suggest an ARIMA model with a seasonal component of AR (1) and a non-seasonal component of AR (2).
4. Click on the **top red triangle** and select **Seasonal ARIMA.** Enter the values as shown (right), and click **Estimate**. JMP displays model results.
5. For the fitted model, check the ACF, PACF and Residual plots to determine if a different model should be fit.

   Here, we repeat Step 4 adding the "3" to **q, Moving Average Order** under **ARIMA**.



JMP provides a **Model Comparison** report (shown below), which indicates that the new model fits the data better (according to criteria such as AIC and SBC). Click and drag the slider bar at the bottom of the report to see all of the statistics.

Model Comparison

ReportGraph	Model	DF	Variance	AIC	SBC	RSquare	-2LogLH	Weights
☑ ☐	Seasonal ARIMA(2, 0, 3)(1, 0, 0)12	89	109138.37	1401.9792	1419.9297	0.710	1387.9792	0.987792
☑ ☐	Seasonal ARIMA(2, 0, 0)(1, 0, 0)12	92	124674.02	1410.7659	1421.0233	0.660	1402.7659	0.012208

- To simultaneously fit a range of ARIMA or Seasonal ARIMA models, select **ARIMA Model Group** from the **top red triangle**.
- Other options, such as **Variogram**, **Spectral Density**, **Difference**, **Smoothing Models** and **Number of Forecast Periods** are available under the **top red triangle**.
- ARIMA models require that the time series be stationary. If the series has a trend over time, differencing will remove the trend. If the series has a non-stationary variance, taking the log of the series may help.
- To forecast the time series with input variables, use a **Transfer Function** (use the **Input List** field in the Time Series dialog window). Transfer function models are also referred to as **ARIMA models with Input Series**.

Visit **Predictive and Specialized Models > Time Series Analysis** in **JMP Help** to learn more.