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Interactive Adjustment and Outlier Detection of Time Dependent Data in R

Contents

Motivation

- X12-ARIMA is widely used and state-of-the-art in many statistical offices
- Statistical offices (we) have to apply seasonal adjustment frequently and to many different time series
- Graphical analysis should always be included in the process
- Results should be reproducable and easy to modify

$\longrightarrow$ R-packages `x12` and `x12GUI`

Features

- Access to X12-ARIMA directly from within `R` (no .spc, .out, . . . files)
- Class oriented command line interface
- Change tracking for the X12-ARIMA parameters and output
- Batch processing of multiple time series at once
- Easy generation of graphical output
- Import the parameter setting from spc files to R

Class `x12Single`

Objects of class `x12Single` contain the following information

- `ts` - The original time serie
- `x12Parameter` - The current X12-ARIMA parameter setting
- `x12Output` - The current X12-ARIMA results
- `x12OldParameter` - All previous X12-ARIMA parameter settings
- `x12OldOutput` - All previous X12-ARIMA results

Methods for this class are:

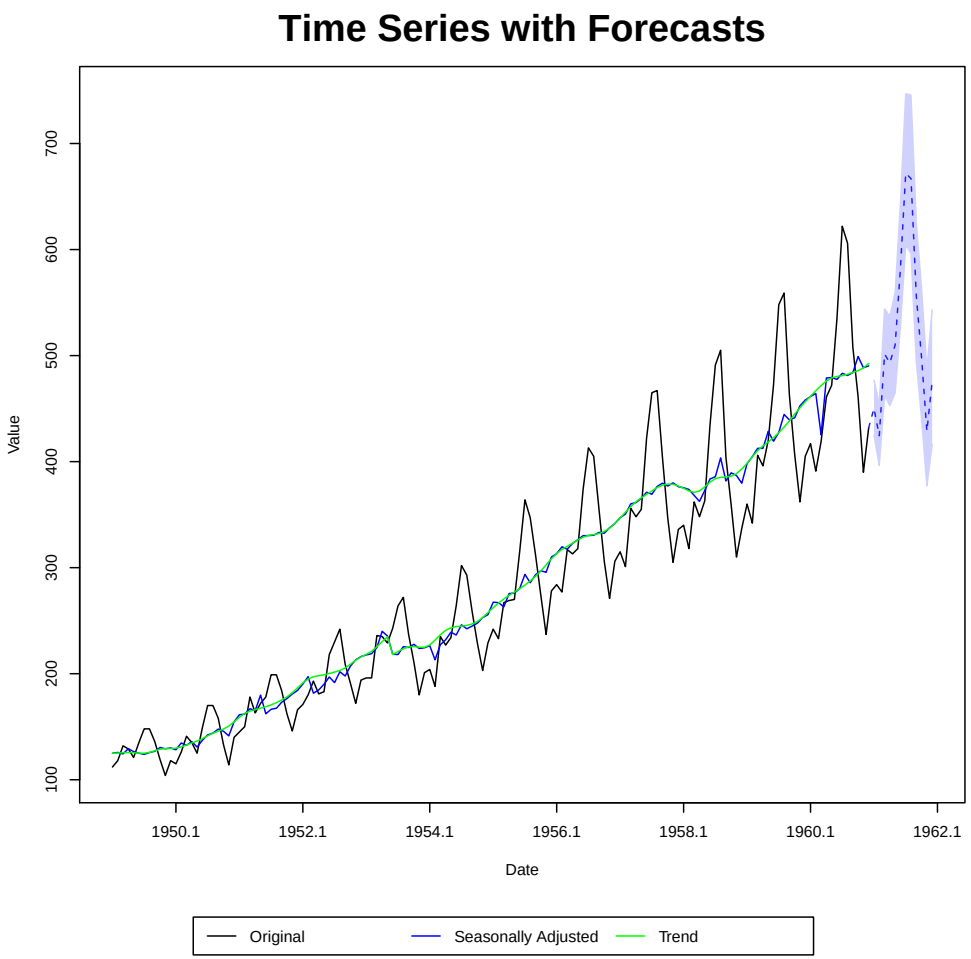
- `X12` - (Re)Run X12-ARIMA
- `setP`,`getP` - Change/View parameters
- `prev`,`cleanHistory` - Revert to a previous X12 parameter setting and output
- `plot`,`plotRsdAcf`,`plotSpec`,`plotSeasFac` - Plot methods

Class `x12Batch`

Objects of class `x12Batch` combine multiple objects of class `x12Single` and inherit their methods

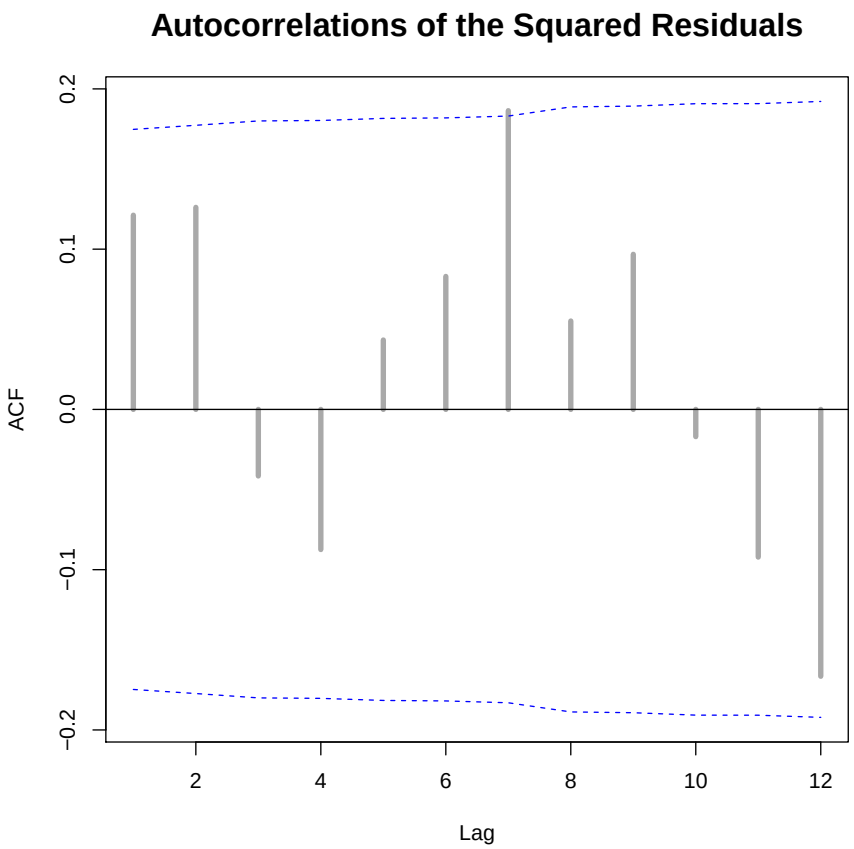
Plot functions I

- Output of the `plot()` method showing trend and forecasts with prediction intervals as well as the seasonally adjusted series.



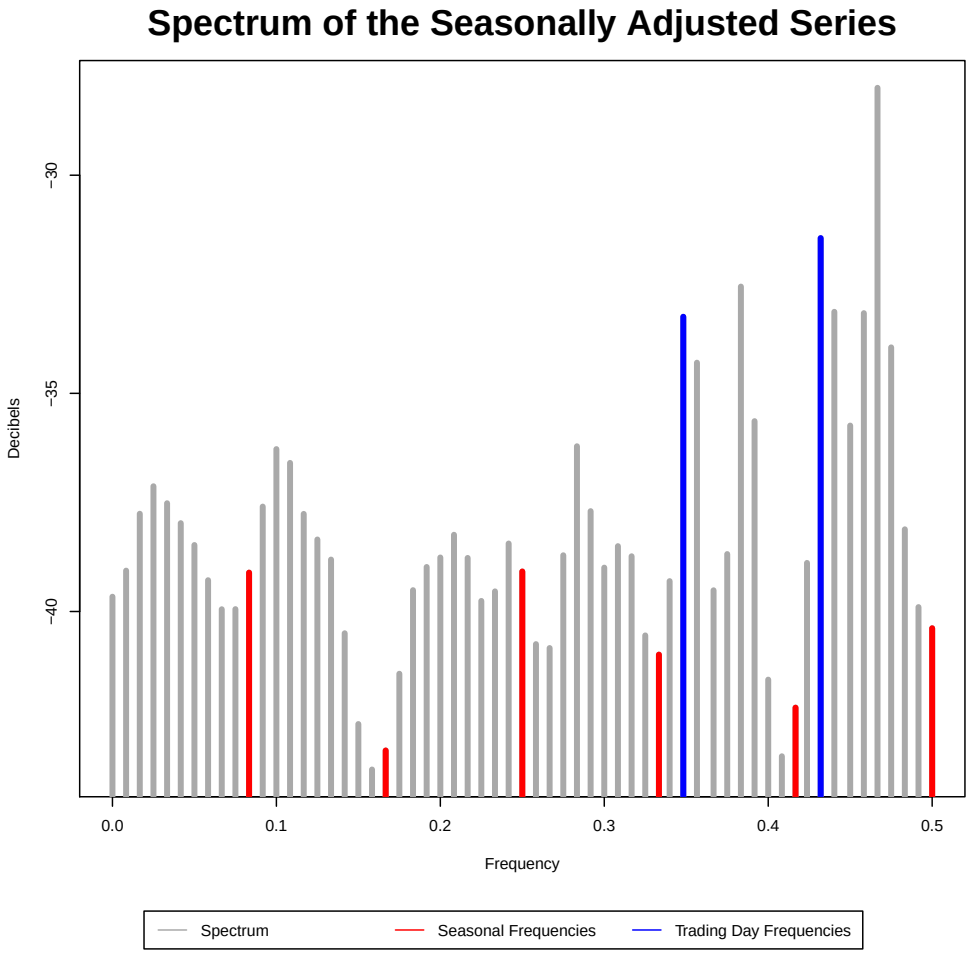
Plot functions II

- Output of the `plotRsdAcf()` function from the R package **x12**, showing the autocorrelations of the squared residuals from the regARIMA model.



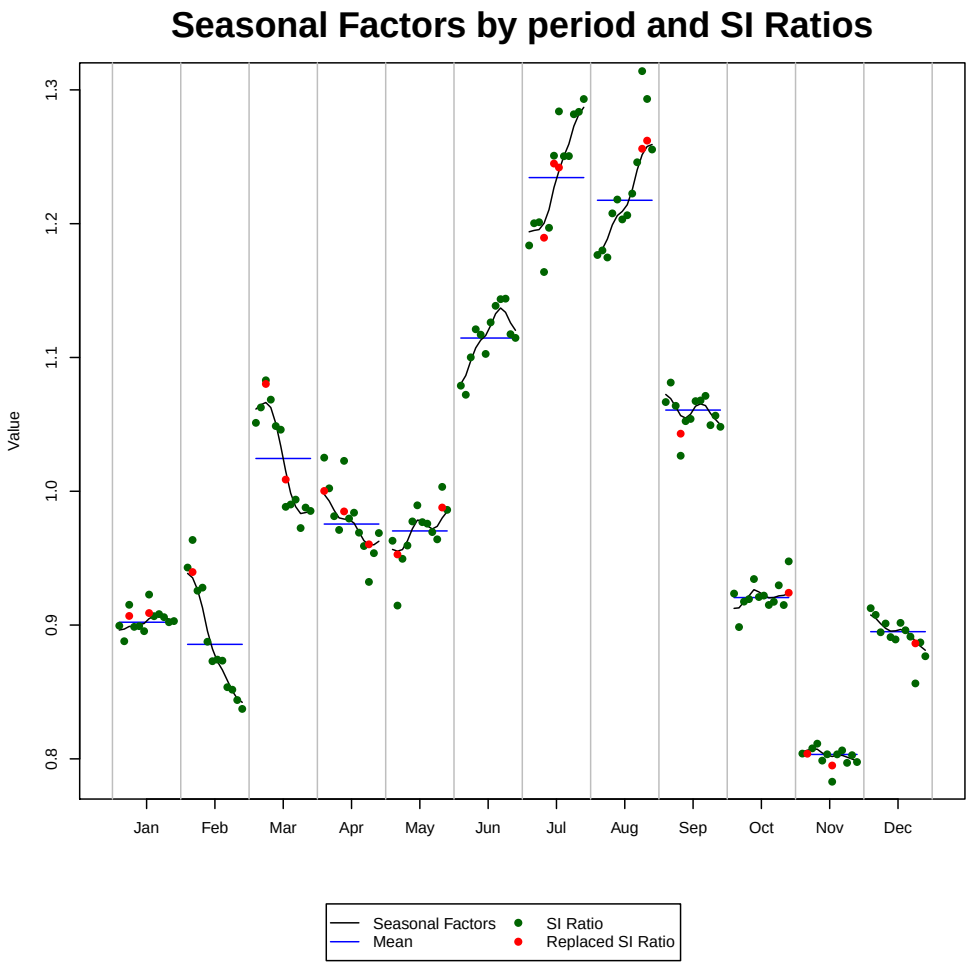
Plot functions III

- Output of the `plotSpec()` function, showing the spectrum of the seasonally adjusted series.



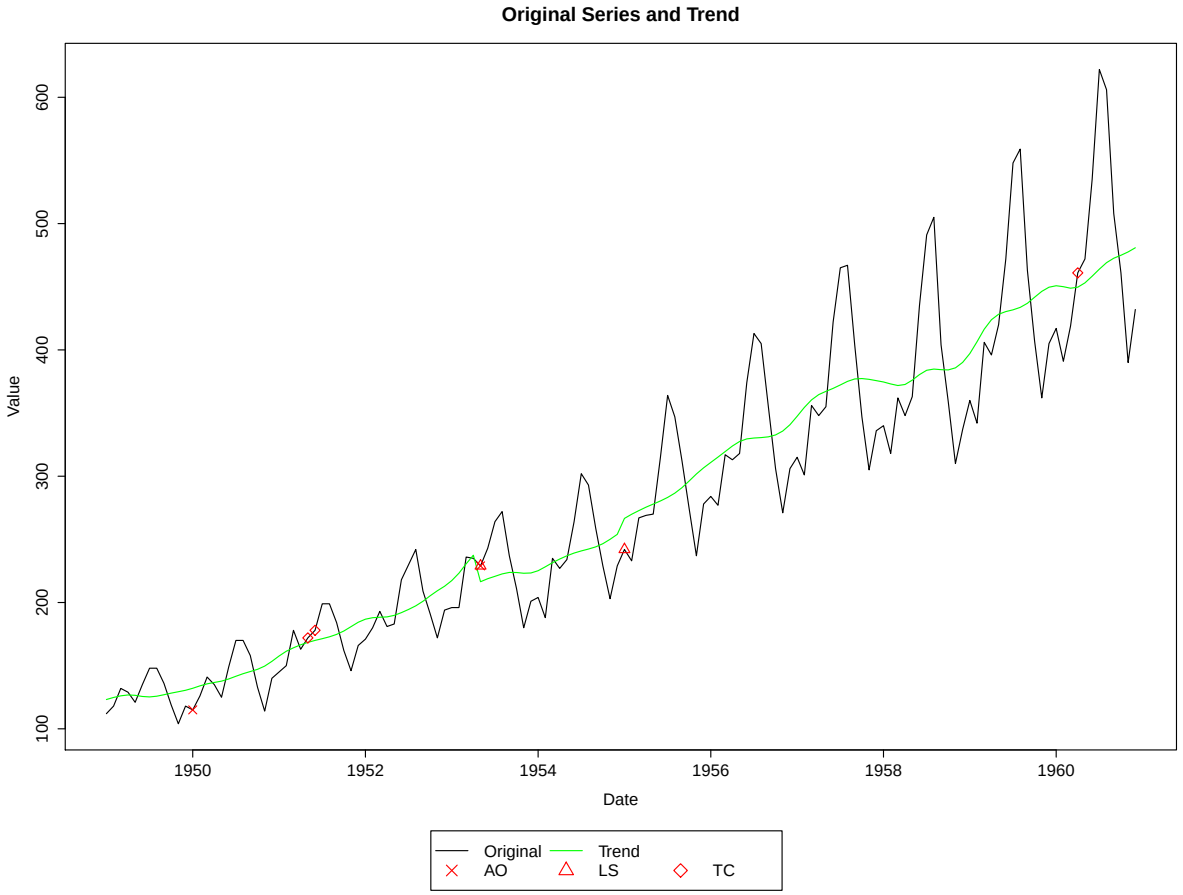
Plot functions IV

- Output of the seasonal factor plot (`plotSeasFac()`).



Plot functions V

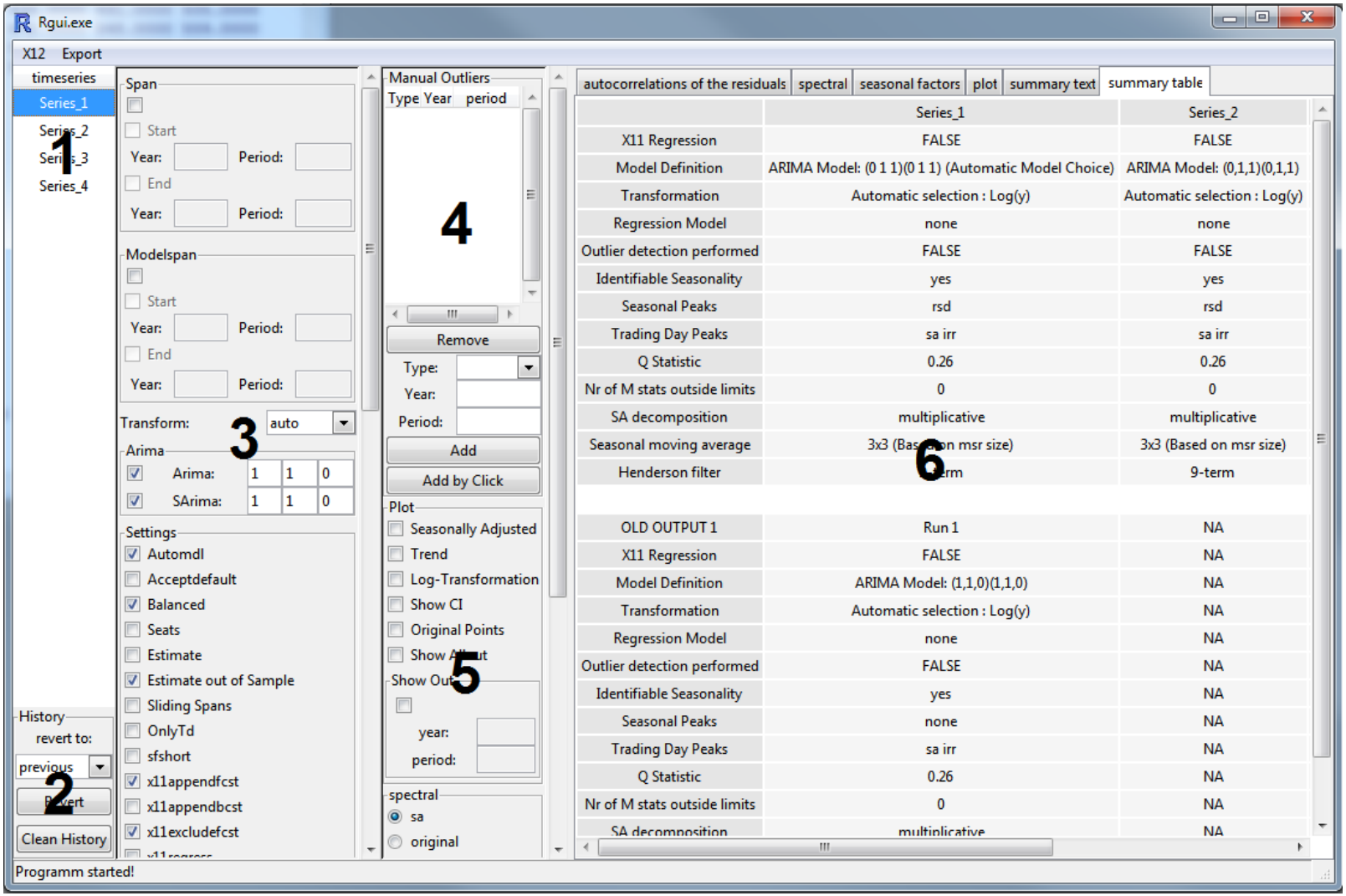
- Output of the `plot()` method showing outliers in the RegARIMA model.



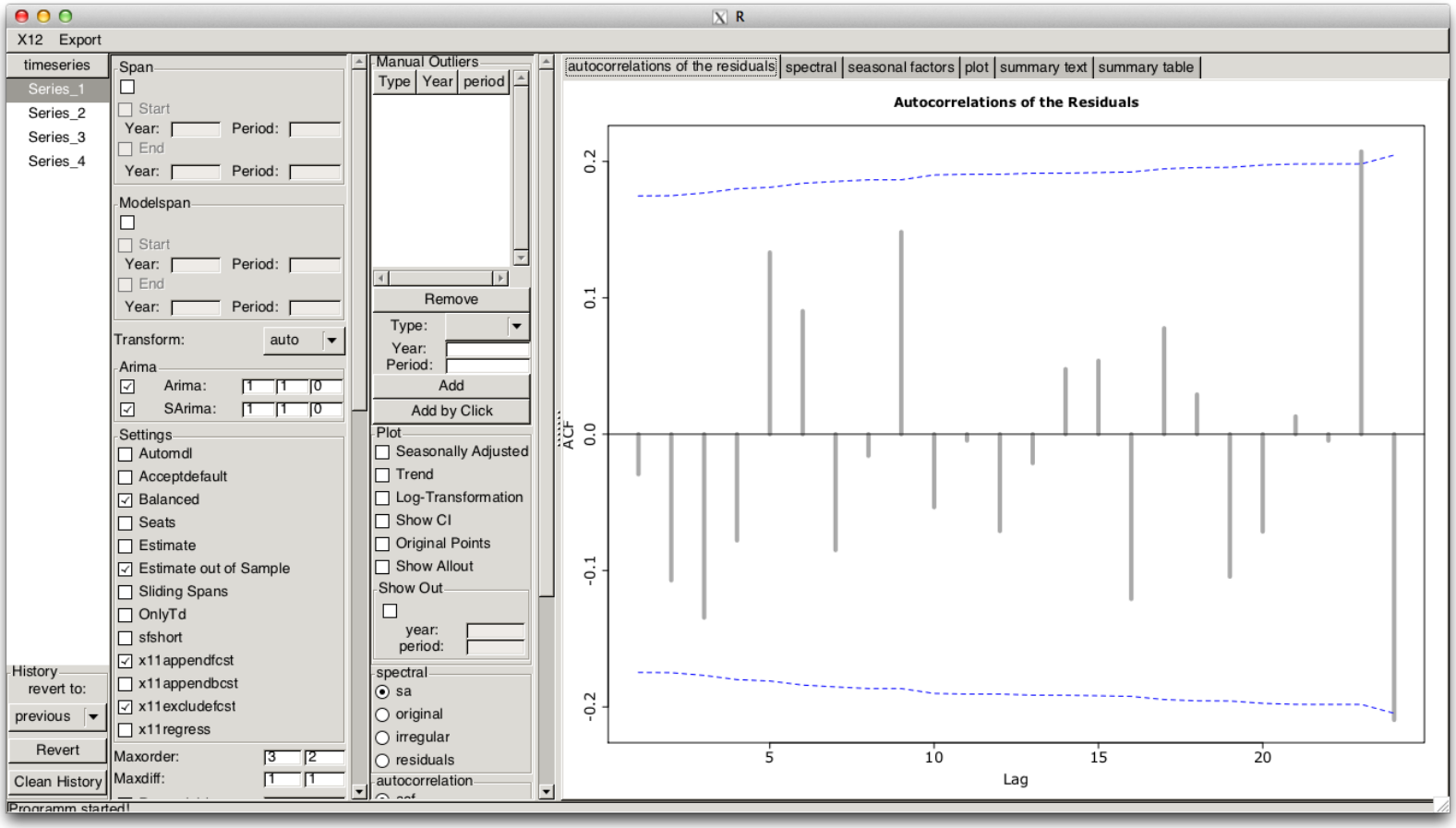
Features x12GUI

- Overview of all (implemented) X12-ARIMA parameters
- Interactive adjustment of the parameters
- Interactive graphics
- Visualisation of the automatically detected outliers
- Easy addition, removal of manually selected outliers

Main View x12GUI



Graphics x12GUI



Interactive Plots x12GUI