R Tools for JDemetra+

Seasonal adjustment made easier

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Task List

Task list:

- Seasonally adjust data with JDemetra+*
- Analysis : check diagnostics and fine tune parameters
- Data visualization and Reporting
- Run a monthly or quarterly production process

*good choice as JDemetra+ is the SA software recommended by Eurostat

Toolbox: Historical Tools: JDemetra + user interface

JDemetra+ graphical interface:

- designed as a launchpad bringing together X-13 and Tramo-seats
- major asset: user-friendly organized output (series, plots, parameters, diagnostics)
- gives instant feedback on the process quality

A production module, called the *cruncher* is provided for batch processing.

You could export the output (data, specifications, diagnostics) and re-import back to R, now you don't have to...

Toolbox: Recent R Tools: RJDemetra (1)

... **as RJDemetra gives the user full and instant access to JDemetra+**:

- algorithms (X-13 and Tramo-seats)
- specification options
- output (adjusted series, intermediate components, diagnostics)

$\rightarrow$ RJDemetra can be used stand alone as a sheer R tool

Toolbox: Recent R Tools: RJDemetra (2)

To run a seasonal adjustment, the user must specify a set of parameters, which can be built:

- from scratch
- from one of the "default" JDemetra+ features
- by modifying any existing specification in a "save as" manner.

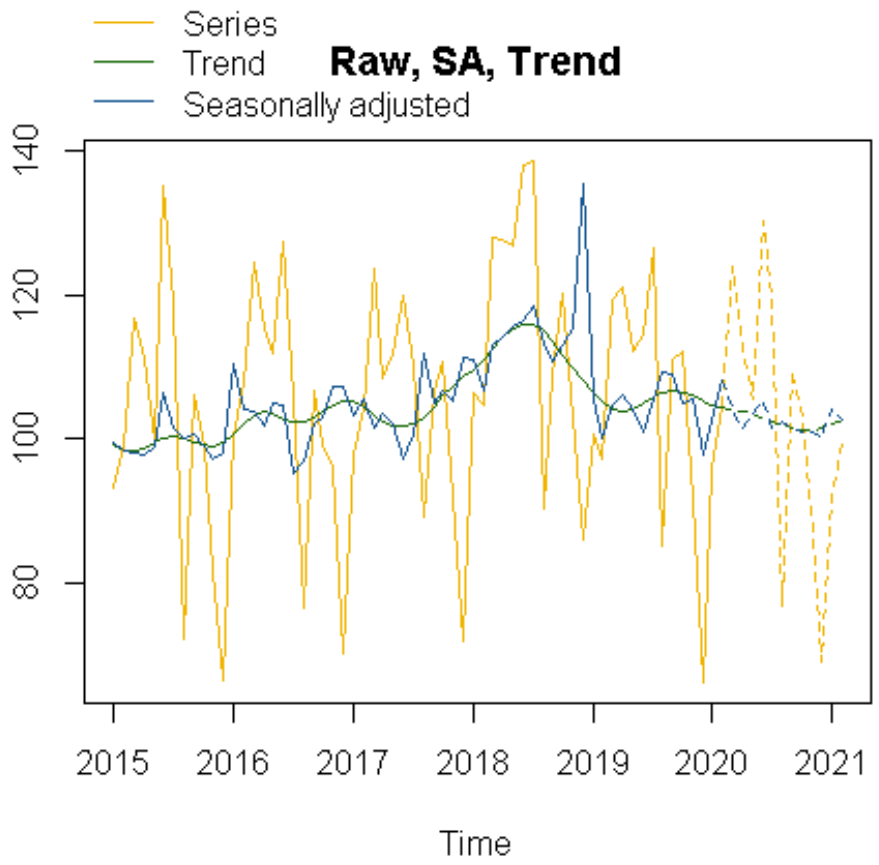
As a consequence:

- massive parameter testing is easy
- so are simulations

as a given specification can be applied to a customized sub-set of series.

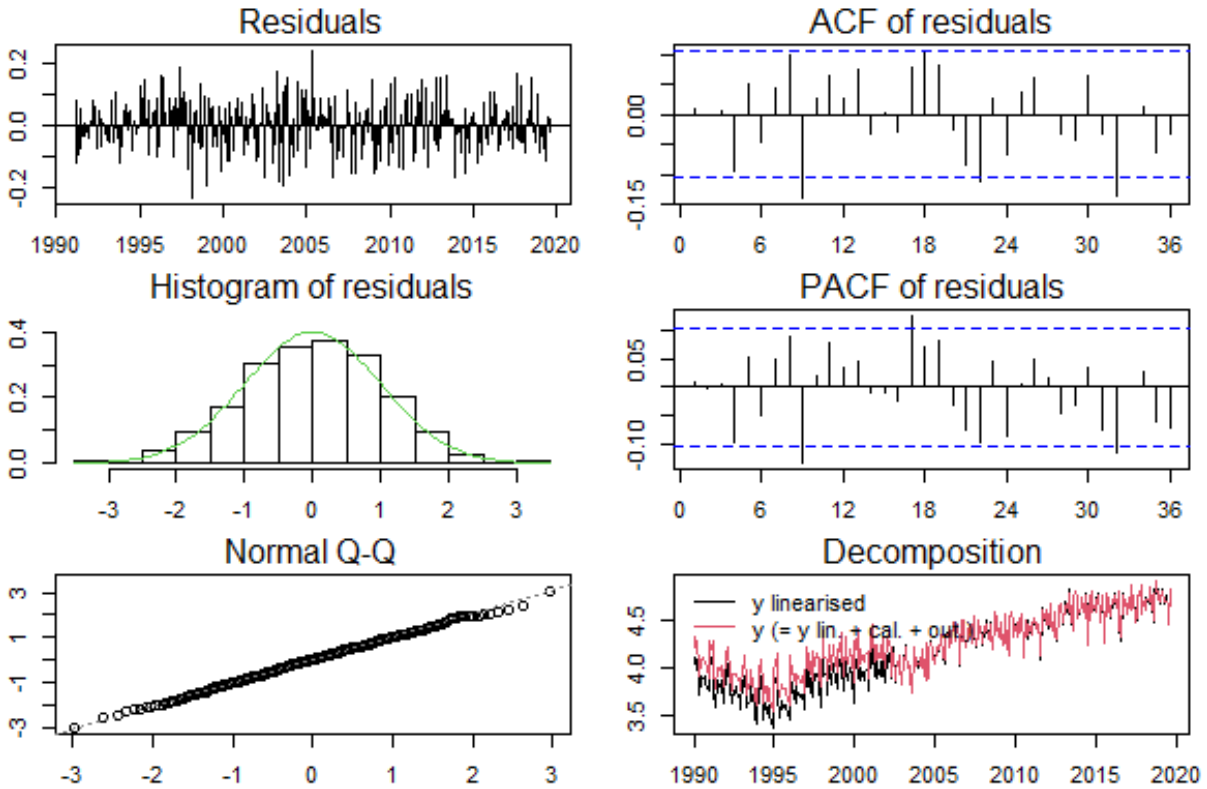
Toolbox: Recent R Tools: RJDemetra (3)

Just like in JDemetra+, SA specific graphs can be displayed and are further customizable in R.



Toolbox: Recent R Tools: RJDemetra (4)

Pre-adjustment related plots: residuals and their ACF, PACF...



Recent R Tools: add-ins to RJDemetra: graphics for communication (1)

RJDemetra is the base-layer for retrieving JDemetra+ data.

There are several add-in packages, for example ggdemetra for adding information about the seasonal adjustment process to a ggplot2 graphic.

Four types of information can be added:

- components (series)
- outliers
- arima model characteristics
- diagnostic table.

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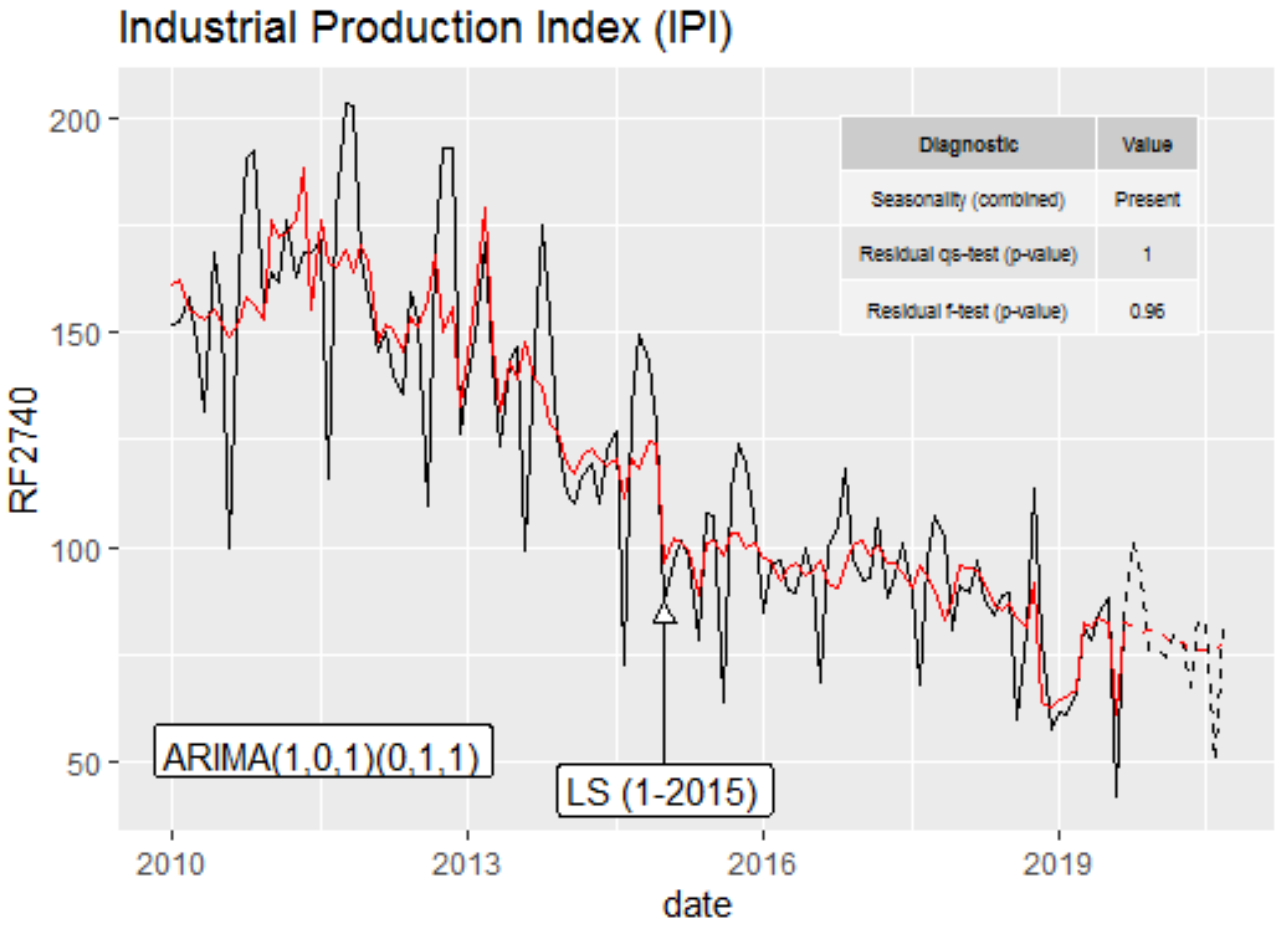
Recent R Tools: add-ins to RJDemetra: graphics for communication (2)



Recent R Tools: add-ins to RJDemetra: reporting (1)

rjdmarkdown allows to create reports (rmd, latex, pdf, htlm), on different steps of the SA process (arima modeling, decomposition, final diagnostics)

```
print_diagnostics(model_sa)
```

Table 5: Diagnostics tests

	$\mathbb{P}(>\|t\|)$	
mean	0.709	
skewness	0.503	
kurtosis	0.593	
ljung box	0.013	*
ljung box (residuals at seasonal lags)	0.875	
ljung box (squared residuals)	0.027	*
qs test on sa	1.000	
qs test on i	1.000	
f-test on sa (seasonal dummies)	0.993	
f-test on i (seasonal dummies)	0.995	
Residual seasonality (entire series)	0.984	
Residual seasonality (last 3 years)	0.776	
f-test on sa (td)	0.926	
f-test on i (td)	0.999	

Recent R Tools: Generating and handling JDemetra+ specific data

- JDemetra+ data(1) is organized in workspaces(2)
- RJDemetra allows to import, add series to and export workspaces
- the rjdworkspace package enables the user to merge them, update their metadata and thereby fully reorganize their data

(1) data = raw data, user-defined auxiliary variables, parameters, output series, qualitydiagnostics

(2) format recognized by the GUI and cruncher

Tool selection: back to the list! (1)

- Running Seasonal adjustment: GUI or RJDemetra
- (Detailed) Analysis and parameters fine tuning
  - GUI: user-friendly feedback, but hard to compare different versions of the process, when fine tuning parameters
  - GUI and RJDemetra used in combination make version comparisons easy and user-friendly
  - RJDemetra: suited for defining and testing a large number of specifications and building a customized quality report

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Tool selection: back to the list! (2)

- Data visualization and Reporting
  - RJDemetra and ggdemetra provide SA specific enhanced plots
  - rjdmarkdown generates code for LateX ready to print process summary tables

- Run a monthly or quarterly production process
  - rjdworkspace helps organizing JDemetra+ specific data
  - the cruncher will generate the output in batch mode, while handling data refreshment policies, allowing the user to keep some parameters fixed...
  - ...whereas the current version of RJDemetra cannot take these refreshment constraints into account, but this feature will be added in the next version

Major upgrade of JDemetra+ coming soon!

JDemetra+ version 3.0 will be released at the end of 2021, embedding, among other new features:

- high frequency data
- extended state space framework

RJDemetra will be upgraded accordingly (RJDemetra3)

However, the versions presented here will keep functioning with the version 2 of JDemetra+, which will be maintained for at least 3 years.

Thank you for your attention !

If you want to learn more, see our working paper:

"R Tools for JDemetra+, seasonal adjustment made easier"
`https://www.insee.fr/fr/statistiques/5019786`

And also

- `https://github.com/jdemetra`
- `https://jdemetradocumentation.github.io/JDemetra-documentation`

(Beware : when you have a hammer, everything looks like a nail)

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