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Persephone

Hierarchical Time Series in R

www.statistik.at We provide information

Overview



- persephone builds on top of RJDemetra
- > the focus lies on hierarchical time series
 - visualization (interactive plots)
 - diagnostics
- only available on GitHub.
 - still under development: interfaces might change
 - CRAN release is planned for this year

```
remotes::install_github("statistikat/persephone")
library(persephone)
```

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Constructing Objects



persephone objects can be constructed from time series

```
class(AirPassengers)

## [1] "ts"

per_obj <- per_x13(AirPassengers)</pre>
```

Now, different methods can be called for the object per_obj.

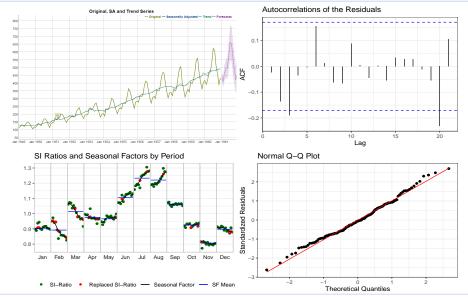
```
per_obj$run()
window(per_obj$adjusted, end = c(1950, 12))
```

```
##
              .Ian
                        Feb
                                 Mar
                                            Apr
                                                     Mav
                                                               .Tiin
        123.7166 125.2532 125.9332 128.1540
                                                129.0103 126.8570
##
        128.1056 133.9933 133.2078 134.0477
                                                134.2078
##
                                  Sep
              .T111 T
                        Aug
                                           Oct
                                                     Nov
                                                               Dec
   1949 123.9033 125.7702 127.0349 128.3796
                                                128.5895 129.3838
        142.6304 145.0065 146.9006 144.5718 140.6555
```

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Plot Types

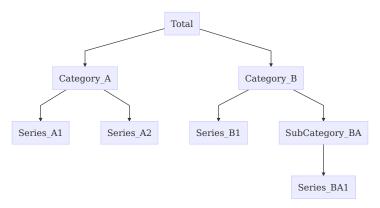




Hierarchical Models



- hierarchical ts: time series that can be broken down into several components
- typical example: price indices
- tree-like structure



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Hierarchical Models (2)



Several persephone objects can be combined to a hierarchical time series.

```
data(ipi_c_eu, package = "RJDemetra")
ht <- per_hts(
   NL = per_x13(ipi_c_eu[, "NL"]),
   FR = per_x13(ipi_c_eu[, "FR"]),
   IE = per_x13(ipi_c_eu[, "IT"])
)
ht$run(); ht</pre>
```

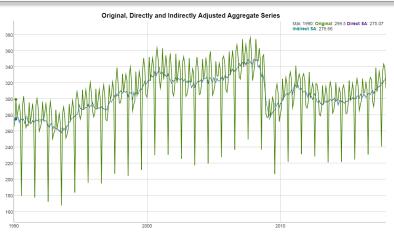
```
component class
##
                          run
                               seasonality log_transform
##
              tramoseats TRUE Present
                                             TRUE
##
    NL
              x13Single TRUE Present FALSE
    FR.
              x13Single TRUE Present FALSE
##
##
    ΙE
              x13Single TRUE Present
                                            FALSE
##
    arima_mdl
                    n_outliers q_stat
##
    (3 1 1)(0 1 1) 1
                                       NΑ
    (0 \ 1 \ 1)(0 \ 1 \ 1) \ 2
##
                              0.2644848
##
    (0 \ 1 \ 1)(0 \ 1 \ 1) \ 3
                               0.2716330
##
    (3 1 1)(0 1 1) 5
                               0.2251183
```

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Hierarchical Plots



```
ht$run()
plot(ht)
```



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Closing Remarks



Further plans:

- Eurostat quality report
- dashboards
- methods for comparing direct and indirect adjustments
- hierarchical time series with dynamic weights

More information (including this presentation) can be found on GitHub pages.

https://statistikat.github.io/persephone/

Thank you for your attention!

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