persephone3

Object oriented wrapper around the seasonal adjustment packages in the rjdverse

1 Objective

Straightforward, scalable seasonal adjustment for official statistics

- → Large number of time series
- → Time-critical production and publication
- → Monthly and quarterly series
- → Hierarchical and weighted aggregate structures
- → Built on the JDemetra+ R ecosystem (rjdverse)
- → R-based workflows

2 Architecture

R6 class hierarchy for seasonal adjustment workflows

All objects inherit from a common **persephone** base class
→ shared interface for modeling, diagnostics, and export

Single-series classes extend the base class
→ **persephoneSingle** with specialized implementations (**x13Single**, **tramoseatsSingle**)

Composite classes organize multiple series
→ **multipleTimeSeries:** independent collections
→ **hierarchicalTimeSeries:** aggregation and hierarchical structure

Hierarchical classes extend batch behavior
→ aggregation, weights, and indirect adjustment

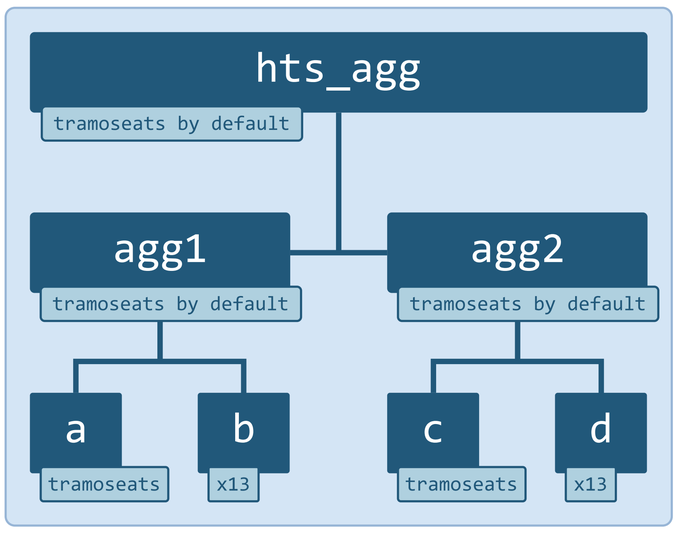
Constructors (factory functions):
perX13(), perTramo() ⟶ **x13Single**, **tramoseatsSingle**
perBatch() ⟶ **multipleTimeSeries**
perHts() ⟶ **hierarchicalTimeSerie**

```
persephone (R6)
│
├── persephoneSingle
│       ├── x13Single
│       └── tramoseatsSingle
│
└── multipleTimeSeries
    └──hierarchicalTimeSeries
```

3 Example Hierarchical time series object

```
hts1 <- perHts(a = perTramo(AirPassengers), b = perX13(AirPassengers))
hts2 <- perHts(c = perTramo(AirPassengers), d = perX13(AirPassengers))
hts_agg <- perHts(agg1 = hts1, agg2 = hts2)
hts_agg$run()
hts_agg
```

```
## component run  method     type      seasonality logTransform arimaMdl
##           TRUE tramoseats aggregate Present     TRUE        (0 1 1)(0 1 1)
## agg1      TRUE tramoseats aggregate Present     TRUE        (0 1 1)(0 1 1)
## agg1/a    TRUE tramoseats single    Present     TRUE        (0 1 0)(0 1 1)
## agg1/b    TRUE x13        single    Present     TRUE        (0 1 1)(0 1 1)
## agg2      TRUE tramoseats aggregate Present     TRUE        (0 1 1)(0 1 1)
## agg2/c    TRUE tramoseats single    Present     TRUE        (0 1 0)(0 1 1)
## agg2/d    TRUE x13        single    Present     TRUE        (0 1 1)(0 1 1)
## outliers Q  Q2   TotalQ
## NA       NA   NA   Good
## NA       NA   NA   Good
## 2        NA   NA   Good
## NA       0.26 0.29 Good
## NA       NA   NA   Good
## 2        NA   NA   Good
## NA       0.26 0.29 Good
```



4 Example Change parameters

```
hts_agg$updateParams(transform.fun = „None“, iterate=TRUE)
hts_agg$run()
hts_agg
```

```
## component run  method     type      seasonality  logTransform arimaMdl
##           TRUE tramoseats aggregate ProbablyNone FALSE        (3 1 1)(0 1 1)
## agg1      TRUE tramoseats aggregate ProbablyNone FALSE        (3 1 1)(0 1 1)
## agg1/a    TRUE tramoseats single    ProbablyNone FALSE        (0 1 0)(0 1 1)
## agg1/b    TRUE x13        single    Present      FALSE        (0 1 1)(0 1 0)
## agg2      TRUE tramoseats aggregate ProbablyNone FALSE        (3 1 1)(0 1 1)
## agg2/c    TRUE tramoseats single    ProbablyNone FALSE        (0 1 0)(0 1 1)
## agg2/d    TRUE x13        single    Present      FALSE        (0 1 1)(0 1 0)
## nOutliers Q   Q2   TotalQ
## 1         NA  NA   Severe
## 1         NA  NA   Severe
## NA        NA  NA   Good
## 1         0.47 0.53 Severe
## 1         NA  NA   Severe
## NA        NA  NA   Good
## 1         0.47 0.53 Severe
```

5 Diagnostics and Dashboard

Interactive exploration of seasonal adjustment results

Fast overview across many series

Dashboard for hierarchical time series and its single components

One function call:

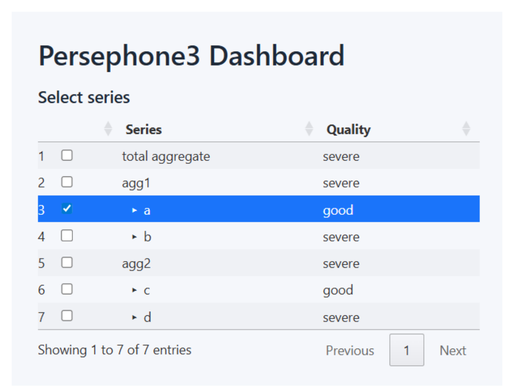
```
createDashboard(hts_agg)
```

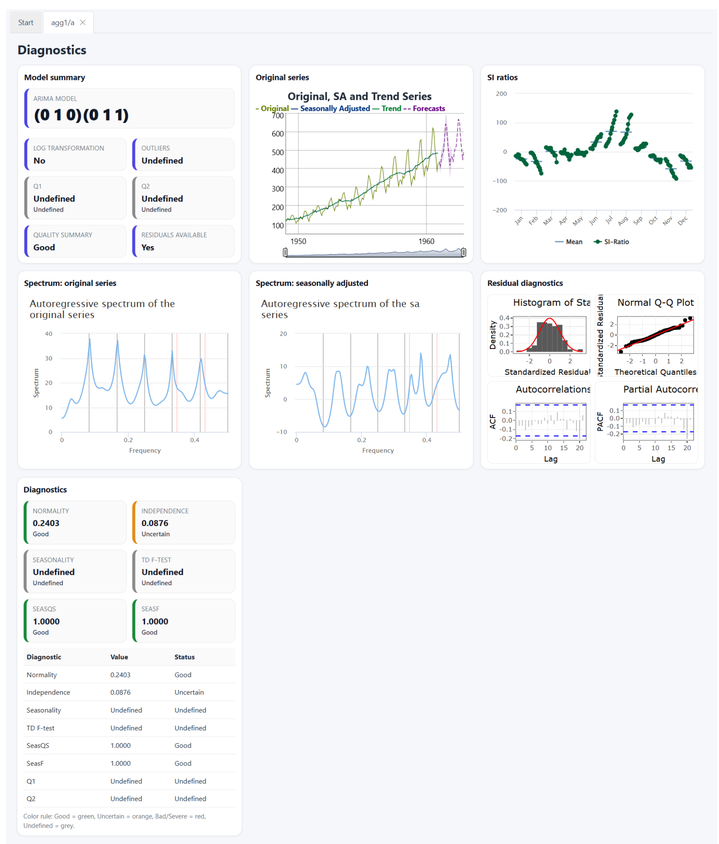
Explore diagnostics and results interactively

Dashboard currently under development

6 Example

Dashboard for hierarchical time series object





STATISTICS AUSTRIA
The Information Manager

GitHub

Built on rjdverse

Questions? Get in touch

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