Class Agnostic Time Series with tsbox : : **CHEAT SHEET**

Basics

IDEA

tsbox provides a time series toolkit which:

1. works identically with most time series **classes**
2. handles regular and irregular **frequencies**
3. **converts** between classes and frequencies

Most functions in tsbox have the same structure:

function starts with ts_

first argument is any ts-boxable object

```
a <- ts_pc(AirPassengers)
```

returns a ts-boxable obect of the same class as input

COMBINE TIME SERIES

collect time series of **all classes** and **frequencies** as multiple time series

```
ts_c(mdeaths, austres)
```

combine time series to a new, single time series (first series wins if overlapping)

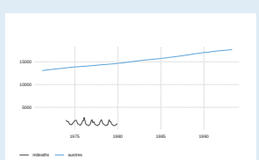
```
ts_bind(mdeaths, austres)
```

like ts_bind, but extra- and retropolate, using growth rates

```
ts_chain(mdeaths, austres)
```

PLOT AND SUMMARIZE

Plot time series of **all classes** and **frequencies**



```
ts_plot(mdeaths, austres)
ts_ggplot(mdeaths, austres)
```

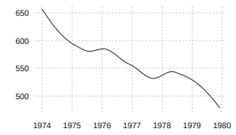
```
ts_summary(ts_c(mdeaths, austres))
```

```
      id obs    diff freq      start        end
1 mdeaths  72 1 month   12 1974-01-01 1979-12-01
2 austres  89 3 month    4 1971-04-01 1993-04-01
```

Helper Functions

Transform time series of **all classes** and **frequencies**

TRANSFORM

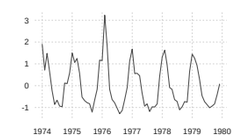


ts_trend(): Trend estimation based on loess

```
ts_trend(fdeaths)
```

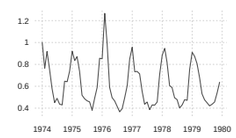
ts_pc(), ts_pcy(), ts_pca(), ts_diff(), ts_diffy(): (annualized) Percentage change rates or differences to previous period, year

```
ts_pc(fdeaths)
```



ts_scale(): normalize mean and variance

```
ts_scale(fdeaths)
```



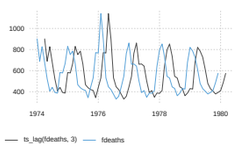
ts_index():Index, based on levels
ts_compound(): Index, based on growth rates

```
ts_index(fdeaths, base = 1976)
```

ts_seas(): seasonal adjustment using X-13

```
ts_seas(fdeaths)
```

SPAN AND FREQUENCY



ts_lag(): Lag or lead of time series

```
ts_lag(fdeaths, 4)
```

ts_frequency(): convert to frequency

```
ts_frequency(fdeaths, "year")
```

ts_span(): filter time series for a time span.

```
ts_span(fdeaths, "1976-01-01")
ts_span(fdeaths, "-5 year")
```

Class Conversion

tsbox is built around a set of converters, which convert time series of the following **supported classes** to each other:

converter function	ts-boxable class
ts_ts()	ts, mts
ts_data.frame(), ts_df()	data.frame
ts_data.table(), ts_dt()	data.table
ts_tbl()	df_tbl, "tibble"
ts_xts()	xts
ts_zoo()	zoo
ts_tibbletime()	tibbletime
ts_timeSeries()	timeSeries
ts_tsibble()	tsibble
ts_tslist()	a list with ts objects

Time Series in data frames

LONG STRUCTURE

Default structure to store multiple time series in long data frames (or data tables, or tibbles)

```
ts_df(ts_c(fdeaths, mdeaths))
```

id	time	value
fdeaths	1974-01-01	901
fdeaths	1974-02-01	689
fdeaths	1974-03-01	827
...	...	...

AUTO-DETECT COLUMN NAMES

tsbox auto-detects a *value*-, a *time*- and zero, one or several *id*-columns. Alternatively, the *time*- and the *value*-column can be explicitly named **time** and **value**.

ts_default(): standardize column names in data frames

RESHAPE

ts_wide(): convert default long structure to wide
ts_long(): convert wide structure to default long

USE WITH PIPE

tsbox plays well with tibbles and with %>%, so it can be easily integrated into a dplyr/pipe workflow

```
library(dplyr)
ts_c(fdeaths, mdeaths) %>%
  ts_tbl() %>%
  ts_trend() %>%
  ts_pc()
```

pass return value as first argument to the next function