Class Agnostic Time Series with tsbox: CHEAT SHEET

Basics

IDEA
tbbox 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
- returns a ts-boxable object 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))

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_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:

<table>
<thead>
<tr>
<th>converter function</th>
<th>ts-boxable class</th>
</tr>
</thead>
<tbody>
<tr>
<td>ts_ts()</td>
<td>ts, mts</td>
</tr>
<tr>
<td>ts_data.frame(), ts_diff()</td>
<td>data.frame</td>
</tr>
<tr>
<td>ts_data.table(), ts_dt()</td>
<td>data.table</td>
</tr>
<tr>
<td>ts_tbl()</td>
<td>df_tbl, &quot;tibble&quot;</td>
</tr>
<tr>
<td>ts_ts()</td>
<td>xts</td>
</tr>
<tr>
<td>ts_zoo()</td>
<td>zoo</td>
</tr>
<tr>
<td>ts_tibble()</td>
<td>&quot;tibble&quot;</td>
</tr>
<tr>
<td>ts_timeSeries()</td>
<td>timeSeries</td>
</tr>
<tr>
<td>ts_tibble()</td>
<td>&quot;tibble&quot;</td>
</tr>
<tr>
<td>ts_tslist()</td>
<td>a list with ts objects</td>
</tr>
</tbody>
</table>

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))

<table>
<thead>
<tr>
<th>id</th>
<th>time</th>
<th>value</th>
</tr>
</thead>
<tbody>
<tr>
<td>fdeaths</td>
<td>1974-01-01</td>
<td>901</td>
</tr>
<tr>
<td>fdeaths</td>
<td>1974-02-01</td>
<td>689</td>
</tr>
<tr>
<td>fdeaths</td>
<td>1974-03-01</td>
<td>827</td>
</tr>
</tbody>
</table>

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
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()