CoDa Vignette

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CoDa R package

This repository contains the source code for the CoDa model for forecasting mortality.

Installation

1. Make sure you have installed the most recent version of R (https://www.r-project.org)
2. Install the package in R using **devtools** by running the following code in your R console:

```
if (!requireNamespace("devtools")) install.packages("devtools")
devtools::install_github("mpascariu/CoDa")
```

Help

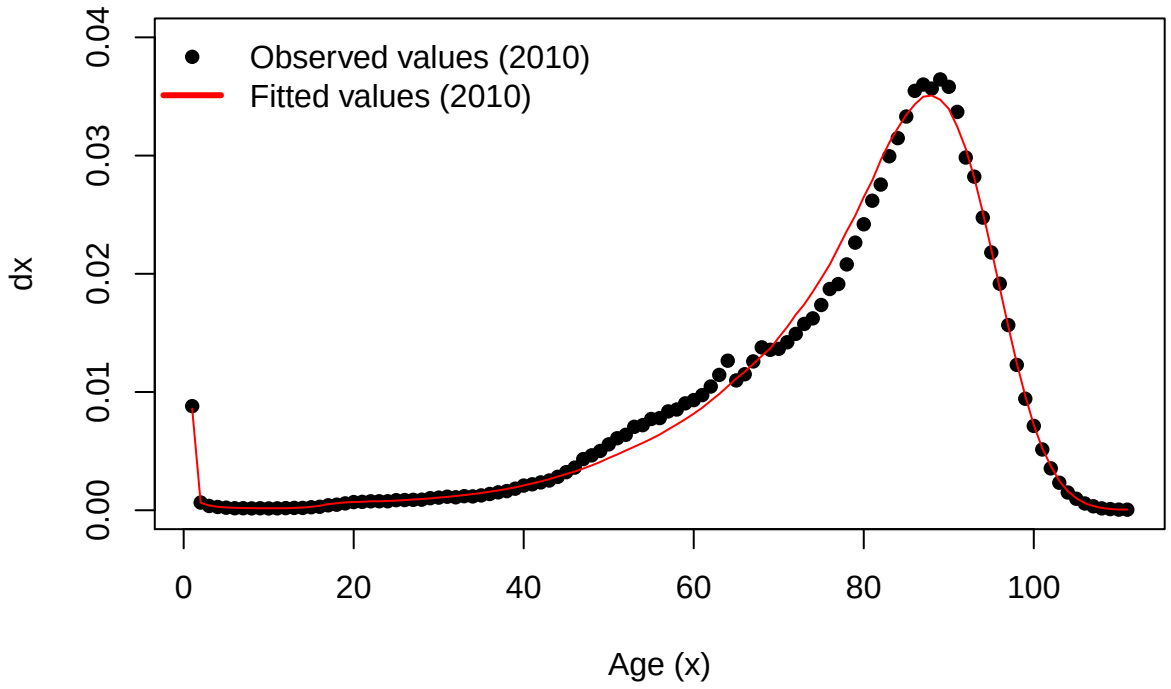
All functions are documented in the standard way, which means that once you load the package using `library(CoDa)` you can just type `?CoDa` to see the help file.

Fit CoDa model

```
rm(list = ls())
library(CoDa)

model1 <- CoDa(CoDa.data, x = 0:110, y = 1960:2014)
model1
```

```
##
## Compositional Data Model fit - CoDa (Oeppen 2008)
## Model with predictor: clr d[x] = a[x] + b[x]k[t]
## Call: CoDa(dx = CoDa.data, x = 0:110, y = 1960:2014)
##
## Years in fit:  1960 - 2014
## Ages in fit:  0 - 110
```



Output objects

```
ls(model1)
```

```
## [1] "call"         "coefficients" "fitted"       "input"
## [5] "residuals"
```

Summary

```
summary(model1)
```

```
##
## Compositional Data Model fit - CoDa (Oeppen 2008)
## Model with predictor: clr d[x] = a[x] + b[x]k[t]
##
## Coefficients:
##          ax       bx    .    y       kt
## 0   0.01882 -0.14822    | 1960  -6.2615
## 1   0.00136 -0.14334    | 1961 -6.25469
## 2   0.00085 -0.14457    | 1962 -6.19413
## 3   0.00064 -0.14831    | 1963 -5.88283
## 4   0.00053 -0.15134    | 1964 -5.80534
## 5   0.00046 -0.15515    | 1965 -5.65574
## ...     ...      ... <NA>  ...      ...
## 105 0.00026  0.20582    | 2009  4.10337
## 106 0.00015  0.20556    | 2010  4.56493
## 107   9e-05  0.18714    | 2011  4.68676
## 108   6e-05  0.15935    | 2012  4.86257
## 109   3e-05   0.1549    | 2013  4.98146
```

```
## 110   6e-05   0.0287    | 2014  5.12442
```

Forecast

Predict life expectancy 30 years in the future using CoDa model:

```
fc_model1 <- predict(model1, n = 30, jumpchoice = 'actual')
fc_model1
```

```
##
## Compositional Data Model forecast
## Ages in forecast:  2015 - 2044
## Time series model (kt): ARIMA(2,2,2)
```