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:

```r
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

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

model1 <- CoDa(edd, x = 0:110, t = 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 = edd, x = 0:110, t = 1960:2014)
##
## Years in fit:  1960 - 2014
## Ages in fit:  0 - 110
```
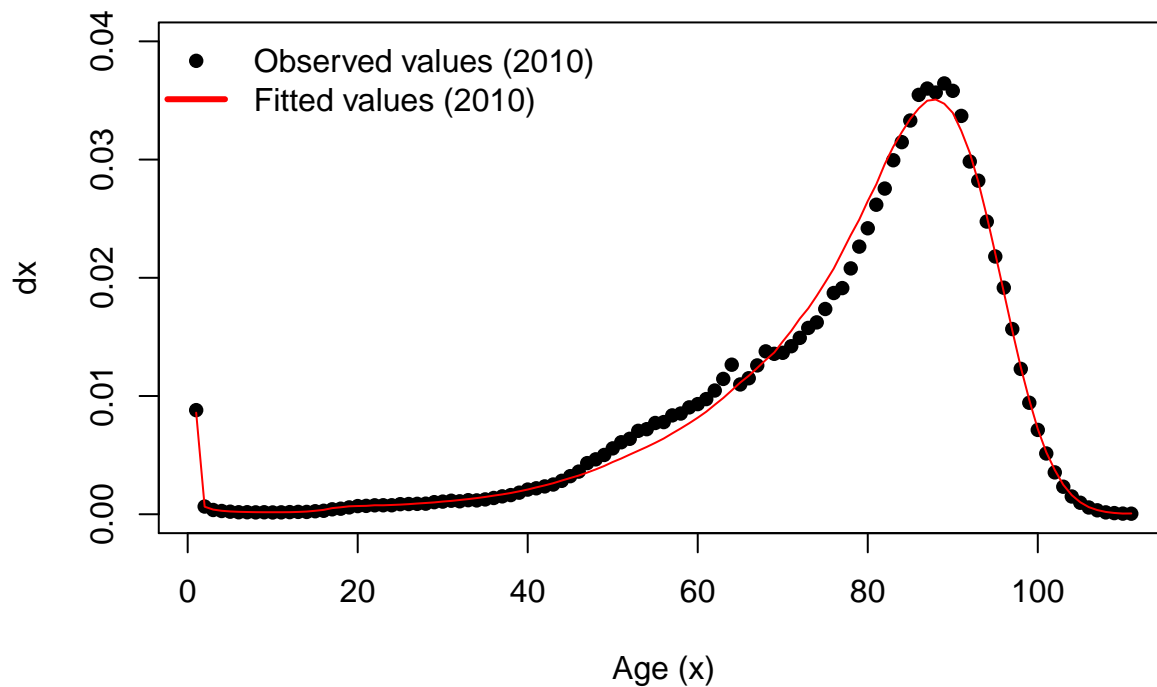
Output objects

```
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      .    t       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)
```