

# 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

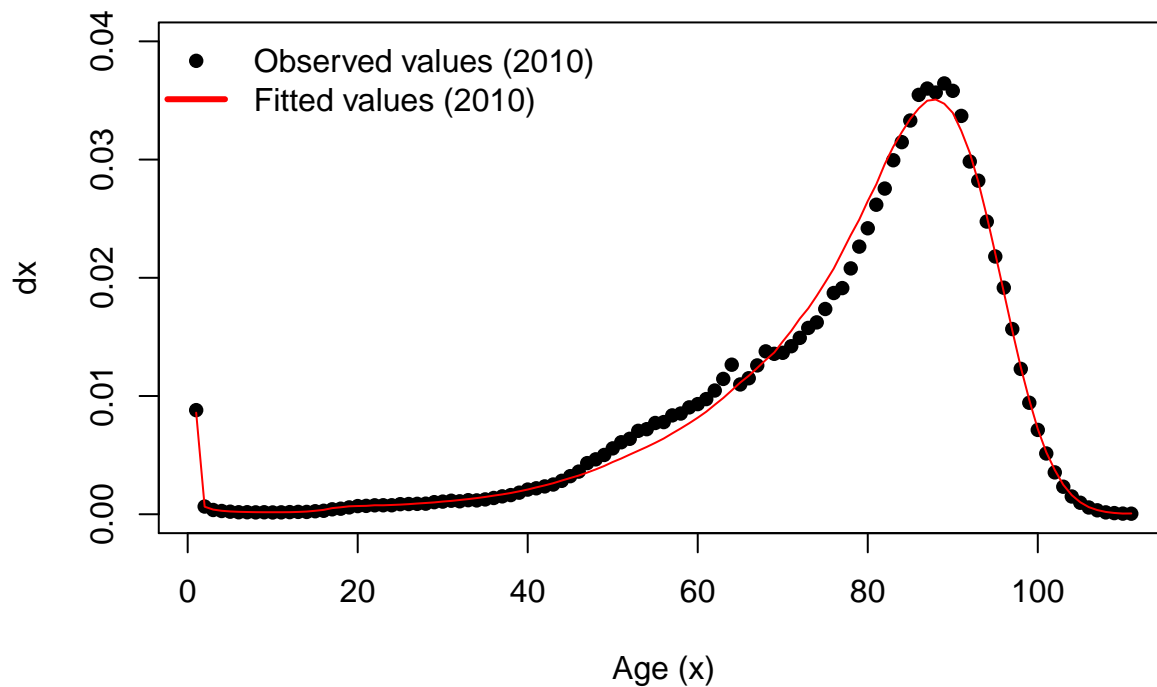
All functions are documented in the standard way, which means that once you load the package using `library(CoDa)` you can just type `?CoDa` to see the help file.

## Fit CoDa model

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

model1 <- CoDa(edd, x = 0:110, t = 1960:2014)
model1

##
## Compositional Data Model fit - CoDa (Oeppen 2008)
## Model with predictor:  $\text{clr } d[x] = a[x] + b[x]k[t]$ 
## 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:  $\text{clr } d[x] = a[x] + b[x]k[t]$ 
##
## 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_model11 <- predict(model11, n = 30, jumpchoice = 'actual')  
fc_model11
```

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

