Package 'Q2q'

July 21, 2025

Type Package

Title Interpolating Age-Specific Mortality Rates at All Ages

Version 0.1.2

Description Mortality rates are typically provided in an abridged format, i.e., by age groups 0, [1, 5], [5, 10]', '[10, 15]', and so on. Some applications necessitate a detailed (single) age description. Despite the large number of proposed approaches in the literature, only a few methods ensure great performance at both younger and higher ages. For example, the 6-term 'Lagrange' interpolation function is well suited to mortality interpolation at younger ages (with irregular intervals), but not at older ages. The 'Karup-King' method, on the other hand, performs well at older ages but is not suitable for younger ones. Interested readers can find a full discussion of the two stated methods in the book Shryock, Siegel, and Associates (1993).The Q2q package combines the two methods to allow for the interpolation of mortality rates across all age groups. It begins by implementing each method independently, and then the resulting curves are linked using a 5-age averaged error between the two partial curves.

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Encoding UTF-8

LazyData true

LazyDataCompression xz

RoxygenNote 7.3.2

Depends R(>= 3.5.0)

Suggests testthat (>= 3.0.0)

Config/testthat/edition 3

URL <https://github.com/Farid-FLICI/Q2q>

NeedsCompilation no

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Contents

Index   **5**

---

getqx   *getqx*

Description

It enables interpolating age-specific mortality rates from an annual life-table.

Usage

```
getqx(Qx, nag)
```

Arguments

Qx   Five-ages mortality rates which can be a vector created using combine function
                'c()' or a column of a numerical matrix.

nag   number of age groups.

Value

qx : a vector of age-specific mortality rates.

lx : a vector of the age evolution of the population of survivors.

dx : a vector of the theoretical distribution of deaths by age.

qxl : a vector of the age-specific mortality rates interpolated using the Lagrange method.

qxk : a vector of the age-specific mortality rates interpolated using the Karup-King method.

junct_age : the age where qxk and qxl have been joined.

Author(s)

Farid FLICI

Examples

```
getqx(Qx=LT[,8], nag=17)
```

---

getqxt *getqxt*

Description

It enables for interpolating age-specific mortality rates for a multi-annual life tables.

Usage

```
getqxt(Qxt, nag, t)
```

Arguments

Qxt   A numerical matrix of Five-ages mortality rates without an age identification column and a time identification row.

nag   The number of age groups.

t   The number of years.

Value

qxt : a matrix containing the age-specific mortality rates by age x in rows and year t in columns.

lxt : a matrix containing the evolution of the population of survivors over age x for each year t.

dxt : a matrix containing the theoretical distribution of deaths by age x for each year t.

qxtl : the age-specific mortality rates interpolated using the Lagrange method for each year t.

qxtk : the age specific mortality rates interpolated using the Karup-King method for each year t.

junct_ages : a vector containing the ages where qxtk and qxtl have been joined, for each year t.

Author(s)

Farid FLICI

Examples

```
getqxt(Qxt=LT, nag=17, t=38)
```

LT *Mortality data*

Description

A dataset containing mortality rates for Algerian men by 5-age groups over the 1977-2014 period.

Usage

```
LT
```

Format

A matrix with 38 columns and 17 rows.

Examples

```
data(LT)
```

Index