

Package ‘Q2q’

November 7, 2024

Type Package

Title Interpolating Age-Specific Mortality Rates at All Ages

Version 0.1.1

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

RoxygenNote 7.3.1

Depends R ($\geq 3.5.0$)

Suggests testthat ($\geq 3.0.0$)

Config/testthat/edition 3

NeedsCompilation no

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Repository CRAN

Date/Publication 2024-11-07 19:50:09 UTC

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getqx

getqx

Description

It interpolate the age specific mortality rates

Usage

getqx(Qx, nag)

Arguments

Qx	Five-ages mortality rates which can be a vector created using or a column of a numerical matrix
nag	number of age groups

Value

qx age-specific mortality rates
 lx a vector containing the age evolution of survivorship
 dx a vector containing the theoretical deaths occurred at age x
 qxtl age specific mortality rates interpolated using the Lagrange method
 qxtk 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	<i>getqxt: obtain the age-specific mortality surface</i>
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Description

getqxt interpolate the age specific mortality rates for a set of period life tables

Usage

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

Arguments

Qxt	A surface of Five-ages mortality rates which should be a numerical matrix containing mortality rates without age identification column and time identification row
nag	The number of age groups
t	The number of years

Value

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

lxt a matrix containing the age evolution of survivorship for the year t

dxt a matrix containing the theoretical deaths occurred at age x and year t

qxlt the age specific mortality rates interpolated using the Lagrange method for each year t

qxkt the age specific mortality rates interpolated using the Karup-king method for each year t

junct_ages a vector containing, for each year t, the ages where qxkt and qxlt have been joined

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)
```

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