Package 'svdComp5q0'

January 29, 2025

Type Package

Title Child/Child-Adult Mortality-Indexed Model Life Tables

Version 0.1.0

Description SVD-Comp mortality model indexed by either child or child and adult mortality. Given input value(s) of either 5q0 or (5q0, 45q15), the predictLT function predicts single-year, age-specific values for 1qx or five-year, age-specific values for 5qx. See <doi:10.48550/arXiv.1612.01408> and <doi:10.1007/s13524-019-00785-3>.

License GPL (>= 3)

Encoding UTF-8

LazyData true

RoxygenNote 7.3.2

NeedsCompilation no

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Depends R (>= 3.5.0)

Contents

expit *Calculate expit (inverse logit).*

Description

Calculate expit (inverse logit).

Usage

```
expit(x)
```

Arguments

x	A number on the real line.

Value

The expit of x.

Examples

```
expit(-5)
```

logit *Calculate logit.*

Description

Calculate logit.

Usage

```
logit(x)
```

Arguments

x	A number in the range (0,1).

Value

The logit of x.

Examples

```
logit(0.5)
```

mods2018 *SVD-Comp Models Data Set - 'mods2018'.*

Description

An R object containing a hierarchy of lists that contain SVD-derived components, estimated model coefficients, and other parameter values necessary to predict new 1qx values using the SVD Component mortality model indexed by child/child-adult mortality implemented by the 'svdComp5q0()' function. The model objects have been 'cleaned' to remove large collections of data that are not necessary to perform predictions - this dramatically reduces their size. This is the 2018 version of the models that replicates the *Demography* paper.

Usage

```
mods2018
```

Format

An R list object with members:

Female: comps: 4 raw SVD-derived components
comps.sm: 4 smoothed SVD-derived components
aml: lm() model object for adult mortality model
v1: lm() model object for v1
v2: lm() model object for v2
v3: lm() model object for v3
v4: lm() model object for v4
offset: offset used when calculating SVD
q0: lm() model object for mortality at age 0
rownames: row labels for the predicted values

Male: comps: 4 raw SVD-derived components
comps.sm: 4 smoothed SVD-derived components
aml: lm() model object for adult mortality model
v1: lm() model object for v1
v2: lm() model object for v2
v3: lm() model object for v3
v4: lm() model object for v4
offset: offset used when calculating SVD
q0: lm() model object for mortality at age 0
rownames: row labels for the predicted values

Author(s)

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Source

See model development in doi:10.48550/arXiv.1612.01408 and doi:10.1007/s13524019007853

`mods2022` *SVD-Comp Models Data Set - 'mods2022'.*

Description

An R object containing a hierarchy of lists that contain SVD-derived components, estimated model coefficients, and other parameter values necessary to predict new 1qx values using the SVD Component mortality model indexed by child/child-adult mortality implemented by the 'svdComp5q0()' function. The model objects have been 'cleaned' to remove large collections of data that are not necessary to perform predictions - this dramatically reduces their size. This is the 2022 version of the models that includes additional Human Mortality Database life tables available after the *Demography* paper was published.

Usage

```
mods2022
```

Format

An R list object with members:

Female: comps: 4 raw SVD-derived components
comps.sm: 4 smoothed SVD-derived components
aml: lm() model object for adult mortality model
v1: lm() model object for v1
v2: lm() model object for v2
v3: lm() model object for v3
v4: lm() model object for v4
offset: offset used when calculating SVD
q0: lm() model object for mortality at age 0
rownames: row labels for the predicted values

Male: comps: 4 raw SVD-derived components
comps.sm: 4 smoothed SVD-derived components
aml: lm() model object for adult mortality model
v1: lm() model object for v1
v2: lm() model object for v2
v3: lm() model object for v3
v4: lm() model object for v4
offset: offset used when calculating SVD
q0: lm() model object for mortality at age 0
rownames: row labels for the predicted values

Author(s)

Samuel J. Clark, <work@samclark.net>

Source

See model development in doi:10.48550/arXiv.1612.01408 and doi:10.1007/s13524019007853

mods2024 *SVD-Comp Models Data Set - 'mods2024'.*

Description

An R object containing a hierarchy of lists that contain SVD-derived components, estimated model coefficients, and other parameter values necessary to predict new 1qx values using the SVD Component mortality model indexed by child/child-adult mortality implemented by the 'svdComp5q0()' function. The model objects have been 'cleaned' to remove large collections of data that are not necessary to perform predictions - this dramatically reduces their size. This is the 2024 version of the models that includes additional Human Mortality Database life tables available after the *Demography* paper was published.

Usage

```
mods2024
```

Format

An R list object with members:

Female: comps: 4 raw SVD-derived components
comps.sm: 4 smoothed SVD-derived components
aml: lm() model object for adult mortality model
v1: lm() model object for v1
v2: lm() model object for v2
v3: lm() model object for v3
v4: lm() model object for v4
offset: offset used when calculating SVD
q0: lm() model object for mortality at age 0
rownames: row labels for the predicted values

Male: comps: 4 raw SVD-derived components
comps.sm: 4 smoothed SVD-derived components
aml: lm() model object for adult mortality model
v1: lm() model object for v1
v2: lm() model object for v2
v3: lm() model object for v3
v4: lm() model object for v4
offset: offset used when calculating SVD
q0: lm() model object for mortality at age 0
rownames: row labels for the predicted values

Author(s)

Samuel J. Clark, <work@samclark.net>

Source

See model development in doi:10.48550/arXiv.1612.01408 and doi:10.1007/s13524019007853

predictLT *Predict a Life Table from Child or Child/Adult Mortality.*

Description

Predict single-year, age-specific probabilities of dying (1qx) using the SVD-Comp mortality model indexed by child/child-adult mortality.

Usage

```
predictLT(
  sex,
  cm,
  smooth = TRUE,
  outlogit = FALSE,
  out5 = TRUE,
  am = NULL,
  modsv = 2018
)
```

Arguments

sex	Character: 'female' or 'male'.
cm	Decimal: the input value(s) for 5q0; either a single value or a vector of values.
smooth	Boolean: use either smooth or raw SVD-derived components. Default is TRUE.
outlogit	Boolean: output either logit scale or natural scale 1qx values. Default is FALSE.
out5	Boolean: if returning natural scale values and out5=TRUE, then return in five-year age groups, 5qx. Default is TRUE.
am	Optional decimal: input value(s) for 45q15; either single value or vector of values. If a vector, must have the same number of elements as cm.
modsv	Optional integer: specifies version of calibration models to use; defaults to 2022 but can be set to 2018.

Value

Data frame: predicted 1qx values for ages 0:109. Age 110 assumed to be 1.0 and not returned. Columns labeled with input child mortality values.

Author(s)

Samuel J. Clark, <work@samclark.net>

References

doi:10.48550/arXiv.1612.01408 and doi:10.1007/s13524019007853

Examples

```
predictLT("female",0.05)
predictLT("female",0.05,modsv=2018)
predictLT("male",0.03,am=0.26)
predictLT("male",0.03,TRUE,TRUE,TRUE,0.26)
predictLT("male",c(0.03,0.01))
## Not run: predictLT("male",c(0.03,0.01),am=0.3)
```

`q1to5` *Convert Life Table Probabilities of Dying from 1-year to Standard 5-year Age Groups.*

Description

Convert 1-year life table probabilities of dying 1qx to standard five-year age groups: 0, 1-4, 5-9, etc.

Usage

```
q1to5(q1)
```

Arguments

`q1`	Decimal: the input values for 1qx; either a single vector or a matrix, age x life table.

Value

Data frame: equivalent values for 5qx.

Author(s)

Samuel J. Clark, <work@samclark.net>

Examples

```
q1 <- predictLT("female",0.08,out5=FALSE)
q1to5(q1)
```

`svdComp5q0` *svdComp5q0: Child or Child/Adult Mortality-Indexed Model Life Tables.*

Description

Implementation of the SVD-Comp mortality model. The `predictLT` function predicts full age schedules of mortality in single year or five-year age groups from either child mortality (5q0) alone or both child (5q0) and adult mortality (45q15). For a full description of the model see arXiv preprint doi:10.48550/arXiv.1612.01408 and published paper in the journal *Demography* doi:10.1007/s13524019007853.

svdComp5q0 functions

predictLT takes child or child/adult mortality and generates full age schedules of mortality.

Author(s)

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