Package 'TSE'

July 21, 2025

Type Package

Title Total Survey Error

Version 0.1.0

Maintainer Joshua Miller <joshlmiller@msn.com>

Description Calculates total survey error (TSE) for one or more surveys, using common scale-dependent and/or scale-independent metrics. On TSE, see: Weisberg, Herbert (2005, ISBN:0-226-89128-3); Biemer, Paul (2010) <doi:10.1093/poq/nfq058>.

Note Package TSE works directly from the data set – no hand calculations required. Just upload a properly structured data set (see TESTNUMB and its documentation), properly input column names (see examples in the functions documentation), and run your functions.

Imports stats

Depends R (>= 3.5)

License GPL (>= 2)

Encoding UTF-8

LazyData true

RoxygenNote 6.1.1

Suggests knitr, rmarkdown

NeedsCompilation no

Author Joshua Miller [aut, cre]

Repository CRAN

Date/Publication 2019-06-20 09:10:03 UTC

Contents

AVEMAE *Calculate average mean absolute error (aMAE)*

Description

Calculates average mean absolute error (aMAE) for one or more surveys

Usage

```
AVEMAE(Actuals1 = data.frame(), Observed1 = data.frame(), ...)
```

Arguments

`Actuals1`	= data from a "gold standard" survey; objects are variable columns from "gold standard" survey that corruspond to variable columns Observed1
`Observed1`	= data from survey 1; objects are variable columns from survey 1 that corruspond to variable columns from Actuals1
`...`	= "gold standard" data/survey # data for additional surveys

Details

aMAE for survey # => mean value of the MAEs for specified variables in survey # => mean value of MAEs for objects in Observed#=data.frame()

Value

Average mean absolute error (aMAE)

Note

Make sure to properly order inputs, per the example: Actuals1=data.frame() objects and corrusponding Observed1=data.frame() objects must be given in the same order as each other; and ... must be given in numbered pairs of Actuals#, Observed#, and those pairs given in sequence of their #s.

Examples

```
AVEMAE(Actuals1=data.frame(TESTNUMB$AQ1, TESTNUMB$AQ2),
Observed1=data.frame(TESTNUMB$O1Q1, TESTNUMB$O1Q2),
Actuals2=data.frame(TESTNUMB$AQ1, TESTNUMB$AQ2),
Observed2=data.frame(TESTNUMB$O2Q1, TESTNUMB$O2Q2),
Actuals3=data.frame(TESTNUMB$AQ1, TESTNUMB$AQ2),
Observed3=data.frame(TESTNUMB$O3Q1, TESTNUMB$O3Q2))
```

AVEMAPE *Calculate average mean absolute percentage error (aMAPE)*

Description

Calculates average mean absolute percentage error (aMAPE) for one or more surveys

Usage

```
AVEMAPE(Actuals1 = data.frame(), Observed1 = data.frame(), ...)
```

Arguments

Actuals1	= data from a "gold standard" survey; objects are variable columns from "gold standard" survey that corruspond to variable columns Observed1
Observed1	= data from survey 1; objects are variable columns from survey 1 that corruspond to variable columns from Actuals1
...	= "gold standard" data/survey # data for additional surveys

Details

aMAPE for survey # => mean value of the MAPEs for specified variables in survey # => mean value of MAPEs for objects in Observed#=data.frame()

Value

Average mean absolute percentage error (aMAPE)

Note

Make sure to properly order inputs, per the example: Actuals1=data.frame() objects and corrusponding Observed1=data.frame() objects must be given in the same order as each other; and ... must be given in numbered pairs of Actuals#, Observed#, and those pairs given in sequence of their #s.

Examples

```
AVEMAPE(Actuals1=data.frame(TESTNUMB$AQ1, TESTNUMB$AQ2),
Observed1=data.frame(TESTNUMB$O1Q1, TESTNUMB$O1Q2),
Actuals2=data.frame(TESTNUMB$AQ1, TESTNUMB$AQ2),
Observed2=data.frame(TESTNUMB$O2Q1, TESTNUMB$O2Q2),
Actuals3=data.frame(TESTNUMB$AQ1, TESTNUMB$AQ2),
Observed3=data.frame(TESTNUMB$O3Q1, TESTNUMB$O3Q2))
```

AVEMSE *Calculate average mean squared error (aMSE) with bias-variance decomposition*

Description

Calculates average mean squared error (aMSE) with bias-variance decomposition for one or more surveys

Usage

```
AVEMSE(Actuals1 = data.frame(), Observed1 = data.frame(), ...)
```

Arguments

Actuals1	= data from a "gold standard" survey; objects are variable columns from "gold standard" survey that corruspond to variable columns Observed1
Observed1	= data from survey 1; objects are variable columns from survey 1 that corruspond to variable columns from Actuals1
...	= "gold standard" data/survey # data for additional surveys

Details

aMSE for survey # => mean value of the MSEs for specified variables in survey # => mean value of MSEs for objects in Observed#=data.frame()

Value

Average mean squared error (aMSE) with bias-variance decomposition

Note

Make sure to properly order inputs, per the example: Actuals1=data.frame() objects and corrusponding Observed1=data.frame() objects must be given in the same order as each other; and ... must be given in numbered pairs of Actuals#, Observed#, and those pairs given in sequence of their #s.

Examples

```
AVEMSE(Actuals1=data.frame(TESTNUMB$AQ1, TESTNUMB$AQ2),
Observed1=data.frame(TESTNUMB$O1Q1, TESTNUMB$O1Q2),
Actuals2=data.frame(TESTNUMB$AQ1, TESTNUMB$AQ2),
Observed2=data.frame(TESTNUMB$O2Q1, TESTNUMB$O2Q2),
Actuals3=data.frame(TESTNUMB$AQ1, TESTNUMB$AQ2),
Observed3=data.frame(TESTNUMB$O3Q1, TESTNUMB$O3Q2))
```

AVEMSLE *Calculate average mean squared logarithmic error (aMSLE)*

Description

Calculates average mean squared logarithmic error (aMSLE) for one or more surveys

Usage

```
AVEMSLE(Actuals1 = data.frame(), Observed1 = data.frame(), ...)
```

Arguments

Actuals1	= data from a "gold standard" survey; objects are variable columns from "gold standard" survey that corruspond to variable columns Observed1
Observed1	= data from survey 1; objects are variable columns from survey 1 that corruspond to variable columns from Actuals1
...	= "gold standard" data/survey # data for additional surveys

Details

aMSLE for survey # => mean value of the MSLEs for specified variables in survey # => mean value of MSLEs for objects in Observed#=data.frame()

Value

Average mean squared logarithmic error (aMSLE)

Note

Make sure to properly order inputs, per the example: Actuals1=data.frame() objects and corrusponding Observed1=data.frame() objects must be given in the same order as each other; and ... must be given in numbered pairs of Actuals#, Observed#, and those pairs given in sequence of their #s.

Examples

```
AVEMSLE(Actuals1=data.frame(TESTNUMB$AQ1, TESTNUMB$AQ2),
Observed1=data.frame(TESTNUMB$O1Q1, TESTNUMB$O1Q2),
Actuals2=data.frame(TESTNUMB$AQ1, TESTNUMB$AQ2),
Observed2=data.frame(TESTNUMB$O2Q1, TESTNUMB$O2Q2),
Actuals3=data.frame(TESTNUMB$AQ1, TESTNUMB$AQ2),
Observed3=data.frame(TESTNUMB$O3Q1, TESTNUMB$O3Q2))
```

AVERAE *Calculate average relative absolute error (aRAE)*

Description

Calculates average relative absolute error (aRAE) for one or more surveys

Usage

```
AVERAE(Actuals1 = data.frame(), Observed1 = data.frame(), ...)
```

Arguments

Actuals1	= data from a "gold standard" survey; objects are variable columns from "gold standard" survey that corruspond to variable columns Observed1
Observed1	= data from survey 1; objects are variable columns from survey 1 that corruspond to variable columns from Actuals1
...	= "gold standard" data/survey # data for additional surveys

Details

aRAE for survey # => mean value of the RAEs for specified variables in survey # => mean value of RAEs for objects in Observed#=data.frame()

Value

Average relative absolute error (aRAE)

Note

Make sure to properly order inputs, per the example: Actuals1=data.frame() objects and corrusponding Observed1=data.frame() objects must be given in the same order as each other; and ... must be given in numbered pairs of Actuals#, Observed#, and those pairs given in sequence of their #s.

Examples

```
AVERAE(Actuals1=data.frame(TESTNUMB$AQ1, TESTNUMB$AQ2),
Observed1=data.frame(TESTNUMB$O1Q1, TESTNUMB$O1Q2),
Actuals2=data.frame(TESTNUMB$AQ1, TESTNUMB$AQ2),
Observed2=data.frame(TESTNUMB$O2Q1, TESTNUMB$O2Q2),
Actuals3=data.frame(TESTNUMB$AQ1, TESTNUMB$AQ2),
Observed3=data.frame(TESTNUMB$O3Q1, TESTNUMB$O3Q2))
```

AVERMSE *Calculate average root mean squared error (aRMSE)*

Description

Calculates average root mean squared error (aRMSE) for one or more surveys

Usage

```
AVERMSE(Actuals1 = data.frame(), Observed1 = data.frame(), ...)
```

Arguments

Actuals1	= data from a "gold standard" survey; objects are variable columns from "gold standard" survey that corruspond to variable columns Observed1
Observed1	= data from survey 1; objects are variable columns from survey 1 that corruspond to variable columns from Actuals1
...	= "gold standard" data/survey # data for additional surveys

Details

aRMSE for survey # => mean value of the RMSEs for specified variables in survey # => mean value of RMSEs for objects in Observed#=data.frame()

Value

Average root mean squared error (aRMSE)

Note

Make sure to properly order inputs, per the example: Actuals1=data.frame() objects and corrusponding Observed1=data.frame() objects must be given in the same order as each other; and ... must be given in numbered pairs of Actuals#, Observed#, and those pairs given in sequence of their #s.

Examples

```
AVERMSE(Actuals1=data.frame(TESTNUMB$AQ1, TESTNUMB$AQ2),
Observed1=data.frame(TESTNUMB$O1Q1, TESTNUMB$O1Q2),
Actuals2=data.frame(TESTNUMB$AQ1, TESTNUMB$AQ2),
Observed2=data.frame(TESTNUMB$O2Q1, TESTNUMB$O2Q2),
Actuals3=data.frame(TESTNUMB$AQ1, TESTNUMB$AQ2),
Observed3=data.frame(TESTNUMB$O3Q1, TESTNUMB$O3Q2))
```

AVERMSLE *Calculate average root mean squared logarithmic error (aRMSLE)*

Description

Calculates average root mean squared logarithmic error (aRMSLE) for one or more surveys

Usage

```
AVERMSLE(Actuals1 = data.frame(), Observed1 = data.frame(), ...)
```

Arguments

`Actuals1`	= data from a "gold standard" survey; objects are variable columns from "gold standard" survey that corruspond to variable columns Observed1
`Observed1`	= data from survey 1; objects are variable columns from survey 1 that corruspond to variable columns from Actuals1
`...`	= "gold standard" data/survey # data for additional surveys

Details

aRMSLE for survey # => mean value of the RMSLEs for specified variables in survey # => mean value of RMSLEs for objects in Observed#=data.frame()

Value

Average root mean squared logarithmic error (aRMSLE)

Note

Make sure to properly order inputs, per the example: Actuals1=data.frame() objects and corrusponding Observed1=data.frame() objects must be given in the same order as each other; and ... must be given in numbered pairs of Actuals#, Observed#, and those pairs given in sequence of their #s.

Examples

```
AVERMSLE(Actuals1=data.frame(TESTNUMB$AQ1, TESTNUMB$AQ2),
Observed1=data.frame(TESTNUMB$O1Q1, TESTNUMB$O1Q2),
Actuals2=data.frame(TESTNUMB$AQ1, TESTNUMB$AQ2),
Observed2=data.frame(TESTNUMB$O2Q1, TESTNUMB$O2Q2),
Actuals3=data.frame(TESTNUMB$AQ1, TESTNUMB$AQ2),
Observed3=data.frame(TESTNUMB$O3Q1, TESTNUMB$O3Q2))
```

AVERRSE *Calculate average root relative squared error (aRRSE)*

Description

Calculates average root relative squared error (aRRSE) for one or more surveys

Usage

```
AVERRSE(Actuals1 = data.frame(), Observed1 = data.frame(), ...)
```

Arguments

Actuals1	= data from a "gold standard" survey; objects are variable columns from "gold standard" survey that corruspond to variable columns Observed1
Observed1	= data from survey 1; objects are variable columns from survey 1 that corruspond to variable columns from Actuals1
...	= "gold standard" data/survey # data for additional surveys

Details

aRRSE for survey # => mean value of the RRSEs for specified variables in survey # => mean value of RRSEs for objects in Observed#=data.frame()

Value

Average root relative squared error (aRRSE)

Note

Make sure to properly order inputs, per the example: Actuals1=data.frame() objects and corrusponding Observed1=data.frame() objects must be given in the same order as each other; and ... must be given in numbered pairs of Actuals#, Observed#, and those pairs given in sequence of their #s.

Examples

```
AVERRSE(Actuals1=data.frame(TESTNUMB$AQ1, TESTNUMB$AQ2),
Observed1=data.frame(TESTNUMB$O1Q1, TESTNUMB$O1Q2),
Actuals2=data.frame(TESTNUMB$AQ1, TESTNUMB$AQ2),
Observed2=data.frame(TESTNUMB$O2Q1, TESTNUMB$O2Q2),
Actuals3=data.frame(TESTNUMB$AQ1, TESTNUMB$AQ2),
Observed3=data.frame(TESTNUMB$O3Q1, TESTNUMB$O3Q2))
```

AVERSE *Calculate average relative squared error (aRSE)*

Description

Calculates average relative squared error (aRSE) for one or more surveys

Usage

```
AVERSE(Actuals1 = data.frame(), Observed1 = data.frame(), ...)
```

Arguments

Actuals1	= data from a "gold standard" survey; objects are variable columns from "gold standard" survey that corruspond to variable columns Observed1
Observed1	= data from survey 1; objects are variable columns from survey 1 that corruspond to variable columns from Actuals1
...	= "gold standard" data/survey # data for additional surveys

Details

aRSE for survey # => mean value of the RSEs for specified variables in survey # => mean value of RSEs for objects in Observed#=data.frame()

Value

Average relative squared error (aRSE)

Note

Make sure to properly order inputs, per the example: Actuals1=data.frame() objects and corrusponding Observed1=data.frame() objects must be given in the same order as each other; and ... must be given in numbered pairs of Actuals#, Observed#, and those pairs given in sequence of their #s.

Examples

```
AVERSE(Actuals1=data.frame(TESTNUMB$AQ1, TESTNUMB$AQ2),
Observed1=data.frame(TESTNUMB$O1Q1, TESTNUMB$O1Q2),
Actuals2=data.frame(TESTNUMB$AQ1, TESTNUMB$AQ2),
Observed2=data.frame(TESTNUMB$O2Q1, TESTNUMB$O2Q2),
Actuals3=data.frame(TESTNUMB$AQ1, TESTNUMB$AQ2),
Observed3=data.frame(TESTNUMB$O3Q1, TESTNUMB$O3Q2))
```

AVESMAPE *Calculate average symmetric mean absolute percentage error (aSMAPE)*

Description

Calculates average symmetric mean absolute percentage error (aSMAPE) for one or more surveys

Usage

```
AVESMAPE(Actuals1 = data.frame(), Observed1 = data.frame(), ...)
```

Arguments

Actuals1	= data from a "gold standard" survey; objects are variable columns from "gold standard" survey that corruspond to variable columns Observed1
Observed1	= data from survey 1; objects are variable columns from survey 1 that corruspond to variable columns from Actuals1
...	= "gold standard" data/survey # data for additional surveys

Details

aSMAPE for survey # => mean value of the SMAPEs for specified variables in survey # => mean value of SMAPEs for objects in Observed#=data.frame()

Value

Average symmetric mean absolute percentage error (aSMAPE)

Note

Make sure to properly order inputs, per the example: Actuals1=data.frame() objects and corrusponding Observed1=data.frame() objects must be given in the same order as each other; and ... must be given in numbered pairs of Actuals#, Observed#, and those pairs given in sequence of their #s.

Examples

```
AVESMAPE(Actuals1=data.frame(TESTNUMB$AQ1, TESTNUMB$AQ2),
Observed1=data.frame(TESTNUMB$O1Q1, TESTNUMB$O1Q2),
Actuals2=data.frame(TESTNUMB$AQ1, TESTNUMB$AQ2),
Observed2=data.frame(TESTNUMB$O2Q1, TESTNUMB$O2Q2),
Actuals3=data.frame(TESTNUMB$AQ1, TESTNUMB$AQ2),
Observed3=data.frame(TESTNUMB$O3Q1, TESTNUMB$O3Q2))
```

FULLSD *Calculate full scale-dependent statistics*

Description

Calculates full scale-dependent statistics for one or more surveys

Usage

```
FULLSD(Actuals1 = data.frame(), Observed1 = data.frame(), ...)
```

Arguments

Actuals1	= data from a "gold standard" survey; objects are variable columns from "gold standard" survey that corruspond to variable columns Observed1
Observed1	= data from survey 1; objects are variable columns from survey 1 that corruspond to variable columns from Actuals1
...	= "gold standard" data/survey # data for additional surveys

Value

Full scale-dependent statistics

Note

Make sure to properly order inputs, per the example: Actuals1=data.frame() objects and corrusponding Observed1=data.frame() objects must be given in the same order as each other; and ... must be given in numbered pairs of Actuals#, Observed#, and those pairs given in sequence of their #s.

Examples

```
FULLSD(Actuals1=data.frame(TESTNUMB$AQ1, TESTNUMB$AQ2),
Observed1=data.frame(TESTNUMB$O1Q1, TESTNUMB$O1Q2),
Actuals2=data.frame(TESTNUMB$AQ1, TESTNUMB$AQ2),
Observed2=data.frame(TESTNUMB$O2Q1, TESTNUMB$O2Q2),
Actuals3=data.frame(TESTNUMB$AQ1, TESTNUMB$AQ2),
Observed3=data.frame(TESTNUMB$O3Q1, TESTNUMB$O3Q2))
```

FULLSI *Calculate full scale-independent statistics*

Description

Calculates full scale-independent statistics for one or more surveys

Usage

```
FULLSI(Actuals1 = data.frame(), Observed1 = data.frame(), ...)
```

Arguments

Actuals1	= data from a "gold standard" survey; objects are variable columns from "gold standard" survey that corruspond to variable columns Observed1
Observed1	= data from survey 1; objects are variable columns from survey 1 that corruspond to variable columns from Actuals1
...	= "gold standard" data/survey # data for additional surveys

Value

Full scale-independent statistics

Note

Make sure to properly order inputs, per the example: Actuals1=data.frame() objects and corrusponding Observed1=data.frame() objects must be given in the same order as each other; and ... must be given in numbered pairs of Actuals#, Observed#, and those pairs given in sequence of their #s.

Examples

```
FULLSI(Actuals1=data.frame(TESTNUMB$AQ1, TESTNUMB$AQ2),
Observed1=data.frame(TESTNUMB$O1Q1, TESTNUMB$O1Q2),
Actuals2=data.frame(TESTNUMB$AQ1, TESTNUMB$AQ2),
Observed2=data.frame(TESTNUMB$O2Q1, TESTNUMB$O2Q2),
Actuals3=data.frame(TESTNUMB$AQ1, TESTNUMB$AQ2),
Observed3=data.frame(TESTNUMB$O3Q1, TESTNUMB$O3Q2))
```

TESTNUMB	*A data set created by merging four smaller data sets. Three of those smaller data sets are data from three surveys (O1, O2, O3); the other is data from a "gold standard" survey (A1). All four smaller data sets consist of the same three variables (Q1, Q2, Q3): responses to the same three questions, asked by each survey from the same 10 respondents (ID), along the same 1-99 response scale.*

Description

A data set created by merging four smaller data sets. Three of those smaller data sets are data from three surveys (O1, O2, O3); the other is data from a "gold standard" survey (A1). All four smaller data sets consist of the same three variables (Q1, Q2, Q3): responses to the same three questions, asked by each survey from the same 10 respondents (ID), along the same 1-99 response scale.

Usage

```
TESTNUMB
```

Format

A data frame with 10 rows and 13 variables

ID, AQ1, AQ2, AQ3, O1Q1, O1Q2, O1Q3, O2Q1, O2Q2, O2Q3, O3Q1, O3Q2, O3Q3 sets of three variables from each of four surveys, merged together

Source

Example data generated by author

Index