Package 'iccCompare'

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Title Comparison of Dependent Intraclass Correlation Coefficients

Version 1.1.0

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Depends R (>= 4.5)

Imports nlme, dplyr, Deriv, MASS, furrr, future, progressr,parallelly, bbmle, mvtnorm

Suggests cccrm

Description Provides methods for testing the equality of dependent intraclass correlation coefficients (ICCs) estimated using linear mixed-effects models. Several of the implemented approaches are based on the work of Donner and Zou (2002) <doi:10.1111/1467-9884.00324>.

License GPL (>= 2)

LazyData true

Encoding UTF-8

RoxygenNote 7.3.3

NeedsCompilation no

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Contents

`icc_dep_test` *Tests the equality of dependent ICCs*

Description

Tests the equality of dependent ICCs

Usage

```
icc_dep_test(
  data,
  ry,
  rind,
  rtype,
  alpha = 0.05,
  Wald = FALSE,
  WL = 1:2,
  Boot = FALSE,
  nboot = 500,
  Perm = FALSE,
  nperm = 100,
  parallel = TRUE,
  workers = 15,
  future_seed = NULL,
  progress = TRUE
)
```

Arguments

`data`	A data frame with (at least) three columns: the outcome, the subject and the setting identifiers.
`ry`	Character string. The outcome variable.
`rind`	Character string. The subject identifier.
`rtype`	Character string. The setting identifier.
`alpha`	Numeric. Significance level. Default to 0.05.
`Wald`	Logical. Should the Wald test be run? Default is FALSE
`WL`	Vector of length two. Which pair of settings should be compared using the Wald test? The first two settings are the default.
`Boot`	Logical. Should bootstrap be run? Default is FALSE.
`nboot`	Numeric. Number of bootstrap resamples. Default is 500.
`Perm`	Logical. Should permutations test be run? Default value is FALSE.
`nperm`	Numeric. Number of permutations. Default value is 100.
`parallel`	Logical. Use parallel computation? Default value is TRUE.

workers	Numeric. Number of cores used in parallelization. Default value is 15.
future_seed	Logical/Integer. The seed to be used for parallellization. Further details in furrr_options.
progress	Logical. If TRUE a progress bar is created while computing bootstrap and permutations. Default value is TRUE

Details

The variance components required for ICC estimation are obtained using a linear mixed-effects model that accounts for correlations across settings. The null hypothesis of equality between dependent ICCs is evaluated through the following methods:

- Wald test based on Fisher's Z and Konishi–Gupta transformations, using either asymptotic or bootstrap standard errors;

- Chi-square test with asymptotic or bootstrap standard errors;

- Permutation test.

Value

The output is a list with the following components:

- Model. Object of class lme with the fitted model estimates.
- Estimates. List containing three objects: 1) a matrix with the ICCs etimates; 2) the variance-covariance matrix of the ICC estimates; 3) Confidence intervals of the ICC estimates.
- p_values. List with the computed p-values testing the equality of the ICCs.
- boot_res. List with three objects: 1) bootstrap estimates of the ICCs; 2) mean of the bootstrap ICC estimates; 3) variance-covariance matrix of the ICC estimates obtained by bootstrapping.
- perm_res. List with three elements: 1) P-value obtained by permutations to test the equality of the ICCs; 2) Vector containing the sum of the squared differences between the ICCs obtained in each permutation; 3) the sum of the squared differences between the ICCs obtained in the original sample.

Examples

```
sin_res_b<-icc_dep_test(sin_data,ry="Sinuosity",rind="id",rtype="Section",alpha=0.05,Wald=TRUE,
WL=1:2,)


sin_res<-icc_dep_test(sin_data,ry="Sinuosity",rind="id",rtype="Section",alpha=0.05,Wald=TRUE,
                      WL=1:2,Boot=TRUE,nboot=500,Perm=TRUE,nperm=100,
                      parallel=TRUE,workers=15,future_seed = NULL,progress=TRUE)



dia_res<-icc_dep_test(cccrm::bpres,ry="DIA",rind="ID",rtype="METODE",alpha=0.05,Wald=TRUE,
WL=1:2,Boot=TRUE,nboot=500,Perm=TRUE,nperm=100,
parallel=TRUE,workers=15,future_seed = NULL,progress=TRUE)
```

`ICC_LR_test` *Tests the equality of dependent ICCs using the likelihood ratio test (LRT)*

Description

Tests the equality of dependent ICCs using the likelihood ratio test (LRT)

Usage

```
ICC_LR_test(data, ry = "y", rind = "ind", rtype = "type", optimizer = "nlminb")
```

Arguments

`data`	A data frame with (at least) three columns: the outcome, the subject and the setting identifiers.
`ry`	Character string. The outcome variable.
`rind`	Character string. The subject identifier.
`rtype`	Character string. The setting identifier.
`optimizer`	Optimization function to use. For further details see `mle2`

Details

The null hypothesis of equality of dependent ICCs is tested using the likelihood ratio test (LRT) proposed in Donner and Zou (2002).

Value

The output is an object of class htest with the following components:

- `null.value`. Vector. The value of the ICC in the null hypothesis of equality of ICCs.
- `estimate`. Vector. The estimates of the ICC
- `statistic`. Numerical. The value of the LR statistic.
- `p.value`. Numerical. The value of the LR statistic.

References

Donner, A. and Zou, G. (2002). Testing the equality of dependent intraclass correlation coefficients. Journal of the Royal Statistical Society: Series D (The Statistician), 51(3):367–379

Examples

```
sin_res<-ICC_LR_test(sin_data,ry="Sinuosity",rind="id",rtype="Section")
```

sin_data *Sinuosity data*

Description

A data frame containingthe sinuosity index from 90 trajectories

Usage

```
sin_data
```

Format

A data frame containingt he sinuosity index from 388 trips of 36 gulls

Sinuosity Sinuosity index

id Subject identifier

Section Time section where the trip started: Day or Night

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