Package ‘CoTiMA’

January 20, 2022

Type Package
Title Continuous Time Meta-Analysis (‘CoTiMA’)
Version 0.5.4
Date 2022-01-20

Description The ‘CoTiMA’ package performs meta-
analyses of correlation matrices of repeatedly measured variables taken from
studies that used different time intervals. Different time intervals between measurement occa-
sions impose problems for
meta-analyses because the effects (e.g. cross-
lagged effects) cannot be simply aggregated, for example, by means of common
fixed or random effects analysis. However, continuous time math, which is applied in ‘Co-
TiMA’, can be used to extrapolate or
intrapolate the results from all studies to any desired time lag. By this, effects obtained in stud-
ies that used different
time intervals can be meta-analyzed. ‘CoTiMA’ fits models to empirical data using the struc-
tural equation model (SEM) package
‘ctsem’, the effects specified in a SEM are related to parameters that are not directly in-
cluded in the model (i.e.,
continuous time parameters; together, they represent the continuous time structural equa-
tion model, CTSEM). Statistical
model comparisons and significance tests are then performed on the continuous time parame-
ter estimates. ‘CoTiMA’ also allows
analysis of publication bias (Egger's test, PET-
PEESE estimates, zcurve analysis etc.) and analysis of statistical power
(post hoc power, required sample sizes). See Dorm-

License GPL-3

URL https://github.com/CoTiMA/CoTiMA

Encoding UTF-8

LazyData true

Depends R (>= 3.5.0), OpenMx (>= 2.18.1), ctsem (>= 3.3.11), lavaan
(>= 0.6), foreach (>= 1.5.1)
**Imports** MBESS (>= 4.6.0), crayon (>= 1.3.4), psych (>= 1.9.12),
doParallel (>= 1.0.15), rootSolve (>= 1.8.2), abind (>= 1.4-5),
RPushbullet (>= 0.3.3), openxlsx (>= 4.2.2), zcurve (>= 1.0.7),
scholar (>= 0.2.0), stringi (>= 1.0.7), MASS

**Suggests** R.rsp

**VignetteBuilder** R.rsp

**RoxygenNote** 7.1.2

**NeedsCompilation** no

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**Repository** CRAN

**Date/Publication** 2022-01-20 10:32:42 UTC

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## A128 example matrix

### Description

A128 example matrix

### Usage

A128

### Format

An object of class `matrix` (inherits from `array`) with 2 rows and 2 columns.

### Author(s)

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>
**A313**

**A313 example matrix**

**Description**

A313 example matrix

**Usage**

A313

**Format**

An object of class `matrix` (inherits from `array`) with 2 rows and 2 columns.

**Author(s)**

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>

---

**addedByResearcher2**

**addedByResearcher2 example vector**

**Description**

addedByResearcher2 example vector

**Usage**

addedByResearcher2

**Format**

An object of class `character` of length 1.

**Author(s)**

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>
**Description**

addedByResearcher3 example vector

**Usage**

addedByResearcher3

**Format**

An object of class character of length 1.

**Author(s)**

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>

---

**Description**

addedByResearcher313 example vector

**Usage**

addedByResearcher313

**Format**

An object of class character of length 1.

**Author(s)**

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>
ageM128

Description
ageM128 example vector

Usage
ageM128

Format
An object of class numeric of length 1.

Author(s)
C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>

ageM18

Description
ageM18 example vector

Usage
ageM18

Format
An object of class numeric of length 1.

Author(s)
C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>
ageM2

Description
ageM2 example vector

Usage
ageM2

Format
An object of class numeric of length 1.

Author(s)
C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>

ageM201

Description
ageM201 example vector

Usage
ageM201

Format
An object of class numeric of length 1.

Author(s)
C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>
ageM3

Description

ageM3 example vector

Usage

ageM3

Format

An object of class numeric of length 1.

Author(s)

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>

ageM313

Description

ageM313 example vector

Usage

ageM313

Format

An object of class numeric of length 1.

Author(s)

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>
**ageM32**  
*ageM32 example vector*

**Description**  
ageM32 example vector

**Usage**  
ageM32

**Format**  
An object of class numeric of length 1.

**Author(s)**  
C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>

---

**ageSD128**  
*ageSD128 example vector*

**Description**  
ageSD128 example vector

**Usage**  
ageSD128

**Format**  
An object of class numeric of length 1.

**Author(s)**  
C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>
ageSD18

**Description**

ageSD18 example vector

**Usage**

ageSD18

**Format**

An object of class numeric of length 1.

**Author(s)**

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>

---

ageSD2

**Description**

ageSD2 example vector

**Usage**

ageSD2

**Format**

An object of class numeric of length 1.

**Author(s)**

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>
**Description**

ageSD201 example vector

**Usage**

ageSD201

**Format**

An object of class numeric of length 1.

**Author(s)**

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>

**Description**

ageSD3 example vector

**Usage**

ageSD3

**Format**

An object of class numeric of length 1.

**Author(s)**

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>
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**Description**

ageSD313 example vector

**Usage**

ageSD313

**Format**

An object of class `numeric` of length 1.

**Author(s)**

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>

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**Description**

ageSD32 example vector

**Usage**

ageSD32

**Format**

An object of class `numeric` of length 1.

**Author(s)**

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>
### alphas128

**Description**

alphas128 example vector

**Usage**

alphas128

**Format**

An object of class numeric of length 9.

**Author(s)**

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>

---

### alphas313

**Description**

alphas313 example vector

**Usage**

alphas313

**Format**

An object of class numeric of length 6.

**Author(s)**

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>
burnout128

**Description**

burnout128 example vector

**Usage**

burnout128

**Format**

An object of class character of length 2.

**Author(s)**

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>

---

burnout18

**Description**

burnout18 example vector

**Usage**

burnout18

**Format**

An object of class character of length 2.

**Author(s)**

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>
burnout2

burnout2 example vector

Description
burnout2 example vector

Usage
burnout2

Format
An object of class character of length 1.

Author(s)
C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>

---

burnout201

burnout201 example vector

Description
burnout201 example vector

Usage
burnout201

Format
An object of class character of length 1.

Author(s)
C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>
burnout3

**Description**

burnout3 example vector

**Usage**

burnout3

**Format**

An object of class character of length 1.

**Author(s)**

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>

---

burnout313

**Description**

burnout313 example vector

**Usage**

burnout313

**Format**

An object of class character of length 1.

**Author(s)**

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>
burnout32

burnout32 example vector

Description

burnout32 example vector

Usage

burnout32

Format

An object of class character of length 2.

Author(s)

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>

combineVariables128

combineVariables128 example vector

Description

combineVariables128 example vector

Usage

combineVariables128

Format

An object of class list of length 3.

Author(s)

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>
Description
combineVariablesNames128

Example vector

Usage
combineVariablesNames128

Format
An object of class character of length 3.

Author(s)
C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>

CoTiMABiG_D_BO

ctmaBiG-object reproducing results of Guthier et al. (2020)

Description
ctmaBiG-object reproducing results of Guthier et al. (2020)

Usage
CoTiMABiG_D_BO

Format
An object of class CoTiMAFit of length 10.

Author(s)
C. Guthier, C. Dormann & J. Cortina <CoTiMA@uni-mainz.org>
CoTiMAFullFit_3

cmaFit-object with a ‘full’ CoTiMA of 3 studies

Description

cmaFit-object with a ‘full’ CoTiMA of 3 studies

Usage

CoTiMAFullFit_3

Format

An object of class CoTiMAFit of length 16.

Author(s)

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>

CoTiMAFullFit_6

cmaFit-object with a ‘full’ CoTiMA of 6 studies

Description

cmaFit-object with a ‘full’ CoTiMA of 6 studies

Usage

CoTiMAFullFit_6

Format

An object of class CoTiMAFit of length 12.

Author(s)

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>
**Description**

cfmaFit-object with a 'full' CoTiMA of 6 studies

**Usage**

CoTiMAFullFit_6_new

**Format**

An object of class CoTiMAFit of length 13.

**Author(s)**

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>

---

**Description**

1st fitted cfmaFit-object in a series of 2 to test equality of 2 cross effects

**Usage**

CoTiMAFullInv23Fit_6

**Format**

An object of class CoTiMAFit of length 14.

**Author(s)**

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>
CoTiMAFullInvEq23Fit_6

2nd fitted ctmaFit-object in a series of 2 to test equality of 2 cross effects

Description

2nd fitted ctmaFit-object in a series of 2 to test equality of 2 cross effects

Usage

CoTiMAFullInvEq23Fit_6

Format

An object of class CoTiMAFit of length 12.

Author(s)

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>

CoTiMAInitFit_3
tmaInit-object with of 3 primary studies

Description

tmaInit-object with of 3 primary studies

Usage

CoTiMAInitFit_3

Format

An object of class CoTiMAFit of length 15.

Author(s)

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>
Description

cmaInit-object with 6 primary studies

Usage

CoTiMAInitFit_6

Format

An object of class CoTiMAFit of length 17.

Author(s)

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>

Description

ctmaInit-object with 6 primary studies

Usage

CoTiMAInitFit_6_new

Format

An object of class CoTiMAFit of length 15.

Author(s)

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>
**CoTiMAInitFit_6_NUTS**

**Description**

ctmaInit-object with a 'full' CoTiMA of 6 studies using NUTS sampler

**Usage**

CoTiMAInitFit_6_NUTS

**Format**

An object of class CoTiMAFit of length 16.

**Author(s)**

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>

---

**CoTiMAInitFit_D_BO**

**ctmaInit-object created by Guthier et al. (2020) with 48 primary studies**

**Description**

ctmaInit-object created by Guthier et al. (2020) with 48 primary studies

**Usage**

CoTiMAInitFit_D_BO

**Format**

An object of class CoTiMAFit of length 12.

**Author(s)**

C. Guthier, C. Dormann & J. Cortina <CoTiMA@uni-mainz.org>
CoTiMAMod1onFullFit_6_cats12

description

cmaFit-object with a categorical moderator of the full drift matrix

usage

CoTiMAMod1onFullFit_6

format

An object of class CoTiMAFit of length 15.

Author(s)

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>

---

CoTiMAMod1onFullFit_6_cats12

description

cmaFit-object with a categorical moderator of the full drift matrix

usage

CoTiMAMod1onFullFit_6_cats12

format

An object of class CoTiMAFit of length 13.

Author(s)

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>
CoTiMAmod2on23Fit_6  ctmaFit-object with a continuous moderator of 2 cross effects

Description
ctmaFit-object with a continuous moderator of 2 cross effects

Usage
CoTiMAmod2on23Fit_6

Format
An object of class CoTiMAfit of length 15.

Author(s)
C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>

CoTiMAoptimFit313  CoTiMAoptimFit313 example vector

Description
CoTiMAoptimFit313 example vector

Usage
CoTiMAoptimFit313

Format
An object of class CoTiMAfit of length 4.

Author(s)
C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>
**CoTiMAPart134Inv3Fit_6**

*ctmaFit-object with with only one cross effect and this one set equal across primary studies*

---

**Description**

*ctmaFit-object with with only one cross effect and this one set equal across primary studies*

**Usage**

```r
CoTiMAPart134Inv3Fit_6
```

**Format**

An object of class `CoTiMAFit` of length 16.

**Author(s)**

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>

---

**CoTiMAPower_D_BO**

*ctmaPower-object reproducing results of Guthier et al. (2020)*

---

**Description**

*ctmaPower-object reproducing results of Guthier et al. (2020)*

**Usage**

```r
CoTiMAPower_D_BO
```

**Format**

An object of class `CoTiMAFit` of length 10.

**Author(s)**

C. Guthier, C. Dormann & J. Cortina <CoTiMA@uni-mainz.org>
CoTiMAStanctArgs

This are preset arguments

Description
This are preset arguments

Usage
CoTiMAStanctArgs

Format
An object of class list of length 33.

CoTiMAstudyList_3

ctmaPrep-object created with 3 primary studies

Description
ctmaPrep-object created with 3 primary studies

Usage
CoTiMAstudyList_3

Format
An object of class CoTiMAFit of length 28.

Author(s)
C. Guthier, C. Dormann & J. Cortina <CoTiMA@uni-mainz.org>
CoTiMAsudyList_6

Description

cmaPrep-object created with 6 primary studies

Usage

CoTiMAsudyList_6

Format

An object of class CoTiMAFit of length 29.

Author(s)

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>

CoTiMAsudyList_6_new

Description

cmaPrep-object created with 6 primary studies

Usage

CoTiMAsudyList_6_new

Format

An object of class CoTiMAFit of length 29.

Author(s)

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>
country128 example vector

Description

country128 example vector

Usage

country128

Format

An object of class character of length 1.

Author(s)

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>

country18 example vector

Description

country18 example vector

Usage

country18

Format

An object of class character of length 1.

Author(s)

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>
country2

Description

country2 example vector

Usage

country2

Format

An object of class character of length 1.

Author(s)

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>


country201

Description

country201 example vector

Usage

country201

Format

An object of class character of length 1.

Author(s)

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>
### country3

**Description**

country3 example vector

**Usage**

country3

**Format**

An object of class character of length 1.

**Author(s)**

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>

---

### country313

**Description**

country313 example vector

**Usage**

country313

**Format**

An object of class character of length 1.

**Author(s)**

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>
**country32**

*country32 example vector*

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**Description**

*country32 example vector*

**Usage**

country32

**Format**

An object of class character of length 1.

**Author(s)**

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**ctmaAllInvFit**

cdmaAllInvFit

---

**Description**

`#' @description Fit a CoTiMA model with all params (drift, T0var, diffusion) invariant across primary studies`

**Usage**

```r
cdmaAllInvFit(
    ctmaInitFit = NULL,
    activeDirectory = NULL,
    activateRPB = FALSE,
    digits = 4,
    drift = drift,
    coresToUse = c(1),
    n.manifest = 0,
    indVarying = FALSE,
    scaleTime = NULL,
    optimize = TRUE,
    nopriors = TRUE,
    finishsamples = NULL,
    iter = NULL,
    chains = NULL,
    verbose = NULL,
    loadAllInvFit = c(),
)```
Arguments

- `ctmaInitFit`: ctmaInitFit
- `activeDirectory`: activeDirectory
- `activateRPB`: activateRPB
- `digits`: digits
- `drift`: Labels for drift effects. Have to be either of the type V1toV2 or 0 for effects to be excluded, which is usually not recommended.
- `coresToUse`: coresToUse
- `n.manifest`: Number of manifest variables of the model (if left empty it will assumed to be identical with n.latent).
- `indVarying`: Allows ct intercepts to vary at the individual level (random effects model, accounts for unobserved heterogeneity)
- `scaleTime`: scaleTime
- `optimize`: optimize
- `nopriors`: nopriors
- `finishsamples`: finishsamples
- `iter`: iter
- `chains`: chains
- `verbose`: verbose
- `loadAllInvFit`: loadAllInvFit
- `saveAllInvFit`: saveAllInvFit
- `silentOverwrite`: silentOverwrite
- `customPar`: logical. If set TRUE (default) leverages the first pass using priors and ensure that the drift diagonal cannot easily go too negative (helps since ctsem > 3.4)

Value

returns a fitted CoTiMA object, in which all drift parameters, Time 0 variances and covariances, and diffusion parameters were set invariant across primary studies.
Description

Analysis of publication bias and generalizability. The function takes a CoTiMA fit object (created with `ctmaInit`) and estimates fixed and random effects of single drift coefficients, heterogeneity (Q, I square, H square, tau square), PET-PEESE corrections, Egger’s tests, and z-curve analysis yielding expected replication and detection rates (ERR, EDR).

Usage

```r
cdmaBiG(
  ctmaInitFit = NULL,
  activeDirectory = NULL,
  PETPEESEalpha = 0.1,
  activateRPB = FALSE,
  digits = 4,
  zcurve = FALSE,
  undoTimeScaling = TRUE
)
```

Arguments

- **ctmaInitFit**: fit object created with `ctmaInit` containing the fitted ctsem model of each primary study
- **activeDirectory**: the directory where to save results (if not specified, it is taken from `ctmaInitFit`)
- **PETPEESEalpha**: probability level (condition) below which to switch from PET to PEESE (cf. Stanley, 2017, p. 582, below Eq. 2; default p = .10)
- **activateRPB**: if TRUE, messages (warning, finished) could be send to smart phone (default = FALSE)
- **digits**: rounding (default = 4)
- **zcurve**: performs z-curve analysis. Could fail if too few studies (e.g. around 10) are supplied. default=FALSE
- **undoTimeScaling**: if TRUE, the original time scale is used (timeScale argument possibly used in `ctmaInit` is undone )

Value

cdmaBiG returns a list containing some arguments supplied, the results of analyses of publication bias and generalizability, model type, and the type of plot that could be performed with the returned object. The arguments in the returned object are activeDirectory, and coresToUse. Further arguments, which are just copied from the init-fit object supplied, are, n.studies, n.latent, studyList, statisticsList, modelResults (all parameter estimates and their standard error), and parameter names.
All new results are returned as the list element "summary", which is printed if the summary function is applied to the returned object. The summary list element comprises a title (model='Analysis of Publication Bias & Generalizability') and "estimates", which is another list comprising “Fixed Effects of Drift Coefficients”, "Heterogeneity", "Random Effects of Drift Coefficients", "PET-PEESE corrections", "Egger's tests" (constant of the WLS regression of drift coefficients on their standard errors (SE) with 1/SE^2 as weights), "Egger's tests Alt. Version" (constant of the OLS regression of the standard normal deviates of the drift coefficients on their precision), and "Z-Curve 2.0 Results". Plot type is plot.type=c("funnel", "forest") and model.type="BiG".

Examples

```r
## Not run:
# perform analyses of publication bias and generalizability
CoTiMAInitFit_D_BO$activeDirectory <- "/Users/tmp/" # adapt!
CoTiMABiG_D_BO <- ctmaBiG(ctmaInitFit=CoTiMAInitFit_D_BO, zcurve=FALSE)
## End(Not run)
#
# display results
summary(CoTiMABiG_D_BO)
## Not run:
# get funnel & forest plots
CoTiMABiG_D_BO$activeDirectory <- "/Users/tmp/" # adapt!
plot(CoTiMABiG_D_BO)
## End(Not run)
```

Description

Analysis of publication bias and fixed and random effects analysis of single drift coefficients if OLD OpenMx fit files are supplied

Usage

```
ctmaBiGOMX(
  ctmaInitFit = NULL,
  activeDirectory = NULL,
  PETPEESEalpha = 0.1,
  activateRPB = FALSE,
  digits = 4
)
```
ctmaCombPRaw

Arguments

- `ctmaInitFit`: fit object created with ctmaInti containing the fitted ctsem model of each primary study
- `activeDirectory`: the directory where to save results (if not specified, it is taken from ctmaInitFit)
- `PETPEESEalpha`: # probability level (condition) below which to switch from PET to PEESE (Stanley, 2017, SPPS,p. 582, below Eq. 2; (default p = .10)
- `activateRPB`: if TRUE, messages (warning, finishes) could be send to smart phone (default = FALSE)
- `digits`: rounding (default = 4)

Value

returns a CoTiMA fit object with results of publication bias analysis, fixed and random effect analysis, Egger’s tests, PET-PEESE corrections.

Description

Combine Pseudo Raw Data (extract them from 'CoTiMAFit object'$studyFitList)

Usage

cdmaCombPRaw(listOfStudyFits = NULL, moderatorValues = NULL)

Arguments

- `listOfStudyFits` : "Listobject of Studyfits"
- `moderatorValues` : "Moderators"

Value

returns a pseudo raw data set that combines pseudo raw data and moderators of primary studies
ctmaCompFit

Description

Performs log-likelihood ratio tests to compare the fit of 2 models (CoTiMAFit objects created with ctmaFit or ctmaEqual), i.e., the difference between the two -2 times LLs between the first model and the more constrained second model. The nested structure of the two models is assumed to be given and not checked.

Usage

cdmaCompFit(model1 = NULL, model2 = NULL)

Arguments

  model1  Model 1
  model2  Model 2

Value

Returns the difference between the two -2 times LLs (Diff_Minus2LL), the associated difference in degrees of freedom (Diff_df (= Diff_n.params)), and the probability (prob).

Examples

  minus2llDiffTest <- ctmaCompFit(CoTiMAFullInv23Fit_6, CoTiMAFullInvEq23Fit_6)
  summary(minus2llDiffTest)

tmaCorRel

Description

Disattenuates the entries in a correlation matrix using a vector of reliabilities.

Usage

cdmaCorRel(empcov = NULL, alphas = NULL)

Arguments

  empcov  Empirical correlation matrix
  alphas  Vector reliabilities
Value
A corrected correlation matrix (corEmpcov). Corrections leading to r > 1.0 are set to 1.0.

Examples
empcov313new <- ctmaCorRel(empcov=empcov313, alphas=alphas313)

Description
changes a full covariance matrix by selecting target variables, recoding them, combining them (compute the mean of two or more variables), and by adding rows/columns with NA if focal variables are not available.

Usage
cdmaEmpCov(
targetVariables = NULL,
recodeVariables = c(),
combineVariables = c(),
combineVariablesNames = c(),
missingVariables = c(),
nlatents = NULL,
Tpoints = NULL,
sampleSize = NULL,
pairwiseN = NULL,
empcov = NULL
)

Arguments
targetVariables (col-/row-) number or names of the target variables
recodeVariables (col-/row-) number or names of the target variables require inverse coding
combineVariables list of vectors, which put together the targeted variables that should be used for composite variables
combineVariablesNames new names for combined variables - not really important
missingVariables missing variables
nlatents number of (latent) variables - actually it is the number of all variables
ctmaEmpCov

Tpoints  number of time points.
sampleSize  sample size
pairwiseN  matrix of same dimensions as empcov containing possible pairwiseN.
empcov  empirical correlation matrix

Value

returns a list with two elements. The first element (results$r) contains the adapted correlation matrix, and the second element (results$pairwiseNNew) an adapted version of a matrix of pairwise N if pairwiseN was provided for the original correlation matrix supplied.

Examples

source17 <- c()
delta_t17 <- c(12)
sampleSize17 <- 440
empcov17 <- matrix(
  c(1.00, -0.60, -0.36, 0.20, 0.62, -0.47, -0.18, 0.20,
    -0.60, 1.00, 0.55, -0.38, -0.43, 0.52, 0.27, -0.21,
    -0.36, 0.55, 1.00, -0.47, -0.26, 0.37, 0.51, -0.28,
    0.20, -0.38, -0.47, 1.00, 0.15, -0.28, -0.35, 0.56,
    0.62, -0.43, -0.26, 0.15, 1.00, -0.63, -0.30, 0.27,
    -0.47, 0.52, 0.37, -0.28, -0.63, 1.00, 0.55, -0.37,
    -0.18, 0.27, 0.51, -0.35, -0.30, 0.55, 1.00, -0.51,
    0.20, -0.21, -0.28, 0.56, 0.27, -0.37, -0.51, 1.00),
nrow=8, ncol=8)
moderator17 <- c(3, 2)
rownames(empcov17) <- colnames(empcov17) <-
c("Workload_1", "Exhaustion_1", "Cynicism_1", "Values_1",
  "Workload_2", "Exhaustion_2", "Cynicism_2", "Values_2")
targetVariables17 <-
c("Workload_1", "Exhaustion_1", "Cynicism_1",
  "Workload_2", "Exhaustion_2", "Cynicism_2")
recodeVariables17 <- c("Workload_1", "Workload_2")
combineVariables17 <- list("Workload_1", c("Exhaustion_1", "Cynicism_1"),
  "Workload_2", c("Exhaustion_2", "Cynicism_2"))
combineVariablesNames17 <- c("Demands_1", "Burnout_1",
  "Demands_2", "Burnout_2")
missingVariables17 <- c();
results17 <- ctmaEmpCov(targetVariables = targetVariables17,
  recodeVariables = recodeVariables17,
  combineVariables = combineVariables17,
  combineVariablesNames = combineVariablesNames17,
  missingVariables = missingVariables17,
  nlatents = 2, sampleSize = sampleSize17,
  Tpoints = 2, empcov = empcov17)
empcov17 <- results17$r
Description

test if the two or more invariant drift parameters in the CoTiMAFit object supplied are equal. The supplied CoTiMA fit-object (ctmaInvariantFit) has to be a model fitted with \texttt{ctmaFit} where at least two parameters were set invariant across primary studies (e.g., 2 cross effects). All parameters that are set invariant in the supplied model are then constrained to be equal by \texttt{ctmaEqual} (no user action required), the model is fitted, and a log-likelihood ratio test is performed informing about the probability that equality applies.

Usage

\begin{verbatim}
cmmaEqual(
    ctmaInvariantFit = NULL,
    activeDirectory = NULL,
    activateRPB = FALSE,
    digits = 4,
    coresToUse = 1
)
\end{verbatim}

Arguments

\begin{description}
\item[ctmaInvariantFit] object to which a CoTiMA fit has been assigned to (i.e., what has been returned by \texttt{ctmaFit}). In most cases probably a model in which (only) two effects were specified with invariantDrift.
\item[activeDirectory] defines another active directory than the one used in ctmaInvariantFit
\item[activateRPB] set to TRUE to receive push messages with CoTiMA notifications on your phone
\item[digits] Number of digits used for rounding (in outputs)
\item[coresToUse] If neg., the value is subtracted from available cores, else value = cores to use
\end{description}

Value

returns a model where two or more parameters were set equal across primary studies and a log-likelihood difference test informing about the probability that the equality assumption is correct.

Examples

\begin{verbatim}
# Fit a CoTiMA with a set of parameters set equal that were set
# invariant in a previous model (of which the fit object is
# supplied in argument ctmainvariantFit)
## Not run:
CoTiMAFullInv23Fit_6$activeDirectory <- "/Users/tmp/" # adapt!
CoTiMAFullInvEq23Fit_6 <- cmmaEqual(ctmaInvariantFit=CoTiMAFullInv23Fit_6)
\end{verbatim}
# Description

Fits a ctsem model with invariant drift effects across primary studies, possible multiple moderators (but all of them of the the same type, either "cont" or "cat"), and possible cluster (e.g., countries where primary studies were conducted).

## Usage

```r
cdmaFit(
    ctmaInitFit = NULL,
    primaryStudyList = NULL,
    cluster = NULL,
    activeDirectory = NULL,
    activateRPB = FALSE,
    digits = 4,
    drift = NULL,
    invariantDrift = NULL,
    moderatedDrift = NULL,
    equalDrift = NULL,
    mod.number = NULL,
    mod.type = "cont",
    mod.names = NULL,
    indVarying = FALSE,
    coresToUse = c(1),
    scaleTI = NULL,
    scaleMod = NULL,
    transfMod = NULL,
    scaleClus = NULL,
    scaleTime = NULL,
    optimize = TRUE,
    nopriors = TRUE,
    finishsamples = NULL,
    iter = NULL,
    chains = NULL,
    verbose = NULL,
    allInvModel = FALSE,
    customPar = FALSE,
    inits = NULL,
    modsToCompare = NULL,
    catsToCompare = NULL,
)```
ctmaFit

driftsToCompare = NULL,
useSampleFraction = NULL)

Arguments

ctmaInitFit  object to which all single ctsem fits of primary studies has been assigned to (i.e., what has been returned by ctmaInit)
primaryStudyList  could be a list of primary studies compiled with ctmaPrep that defines the subset of studies in ctmaInitFit that should actually be used
cluster  vector with cluster variables (e.g., countries). Has to be set up carefully. Will be included in ctmaPrep in later 'CoTiMA' versions.
activeDirectory  defines another active directory than the one used in ctmaInitFit
activateRPB  set to TRUE to receive push messages with 'CoTiMA' notifications on your phone
digits  Number of digits used for rounding (in outputs)
drift  labels for drift effects. Have to be either of the type 'V1toV2' or '0' for effects to be excluded.
invariantDrift  drift labels for drift effects that are set invariant across primary studies (default = all drift effects).
moderatedDrift  labels for drift effects that are moderated (default = all drift effects)
equalDrift  Not enabled
mod.number  which in the vector of moderator values shall be used (e.g., 2 for a single moderator or 1:3 for 3 moderators simultaneously)
mod.type  'cont' or 'cat' (mixing them in a single model not yet possible)
mod.names  vector of names for moderators used in output
indVarying  allows continuous time intercepts to vary at the individual level (random effects model, accounts for unobserved heterogeneity)
coresToUse  if negative, the value is subtracted from available cores, else value = cores to use
scaleTI  scale TI predictors - not recommended if TI are dummies representing primary studies, which would be the usual case
scaleMod  scale moderator variables - FALSE (default) highly recommended for categorical moderators, TRUE highly recommended for continuous moderators
transfMod  more general option to change moderator values. A vector as long as number of moderators analyzed (e.g., c("mean(x)", "x - median(x)"))
scaleClus  scale vector of cluster indicators - TRUE (default) yields avg. drift estimates, FALSE yields drift estimates of last cluster
scaleTime  scale time (interval) - sometimes desirable to improve fitting
optimize  if set to FALSE, Stan’s Hamiltonian Monte Carlo sampler is used (default = TRUE = maximum a posteriori / importance sampling).
ctmaFit

nopriors: if TRUE, any priors are disabled – sometimes desirable for optimization

finishesamples: number of samples to draw (either from hessian based covariance or posterior distribution) for final results computation (default = 1000).

iter: number of iterations (default = 1000). Sometimes larger values could be required for Bayesian estimation

chains: number of chains to sample, during HMC or post-optimization importance sampling.

verbose: integer from 0 to 2. Higher values print more information during model fit – for debugging

allInvModel: estimates a model with all parameters invariant (DRIFT, DIFFUSION, T0VAR) if set TRUE (default = FALSE)

customPar: logical. If set TRUE leverages the first pass using priors and ensure that the drift diagonal cannot easily go too negative (helps since ctsem > 3.4)

inits: vector of start values

modsToCompare: when performing contrasts for categorical moderators, the moderator numbers (position in mod.number) that is used

catsToCompare: when performing contrasts for categorical moderators, the categories (values, not positions) for which effects are set equal

driftsToCompare: when performing contrasts for categorical moderators, the (subset of) drift effects analyzed

useSampleFraction: to speed up debugging. Provided as fraction (e.g., 1/10).

Value

chmaFit returns a list containing some arguments supplied, the fitted model, different elements summarizing the main results, model type, and the type of plot that could be performed with the returned object. The arguments in the returned object are activeDirectory, coresToUse, moderator names (mod.names), and moderator type (mod.type). Further arguments, which are just copied from the init-fit object supplied, are, n.latent, studyList, parameterNames, and statisticsList. The fitted model is found in studyFitList, which is a large list with many elements (e.g., the ctsem model specified by CoTiMA, the rstan model created by ctsem, the fitted rstan model etc.). Further results returned are n.studies = 1 (required for proper plotting), data (created pseudo raw data), and a list with modelResults (i.e., DRIFT=model_Drift_Coef, DIFFUSION=model_Diffusion_Coef, T0VAR=model_T0var_Coef, CINT=model_Cint_Coef, MOD=modelTI_Coeff, and CLUS=clusTI_Coeff). Possible invariance constraints are included in invariantDrift. The number of moderators simultaneously analyzed are included in n.moderators. The most important new results are returned as the list element "summary", which is printed if the summary function is applied to the returned object. The summary list element comprises "estimates" (the aggregated effects), possible randomEffects (not yet fully working), the minus2ll value and its n.parameters, the opt.lag sensu Dormann & Griffin (2015) and the max.effects that occur at the opt.lag, clus.effects and mod.effects, and possible warning messages (message). Plot type is plot.type=c("drift") and model.type="stanct" ("omx" was deprecated).
Examples

## Not run:
# Example 1. Fit a CoTiMA to all primary studies previously fitted one by one
# with the fits assigned to CoTiMAInitFit_6
CoTIMAFullFit_6 <- ctmaFit(ctmaInitFit=CoTIMAInitFit_6)
summary(CoTIMAFullFit_6)
## End(Not run)

## Not run:
# Example 2. Fit a CoTiMA with only 2 cross effects invariant (not the auto
# effects) to all primary studies previously fitted one by one with the fits
# assigned to CoTiMAInitFit_6
CoTIMAInitFit_6$activeDirectory <- "/Users/tmp/" # adapt!
CoTIMAFullInv23Fit_6 <- ctmaFit(ctmaInitFit=CoTIMAInitFit_6,
    invariantDrift=c("V1toV2", "V2toV1"))
summary(CoTIMAFullInv23Fit_6)
## End(Not run)

## Not run:
# Example 3. Fit a moderated CoTiMA
CoTIMAInitFit_6$activeDirectory <- "/Users/tmp/" # adapt!
CoTIMAMod1onFullFit_6 <- ctmaFit(ctmaInitFit=CoTIMAInitFit_6,
    mod.number=1, mod.type="cont",
    mod.names=c("Control"))
summary(CoTIMAMod1onFullFit_6)
## End(Not run)

ctmaFitList

Description

Combines CoTiMAFit objects into a list with class CoTiMAFit to inform generic functions what to do

Usage

cdmaFitList(...)

Arguments

... any number of CoTiMAFit objects

Value

a list that combines all objects supplied and is assigned the class 'CoTiMAFit'
## Description

Extracts information from fitted CoTiMA objects to (re-)create list of primary studies originally created with \texttt{ctmaPrep}.

## Usage

\begin{verbatim}
ctmaFitToPrep(ctmaFitObject = NULL)
\end{verbatim}

## Arguments

- \texttt{ctmaFitObject}: \texttt{ctmaFitObject}

## Value

list that could be used for fitting new CoTiMA models with \texttt{ctmaInit} or \texttt{ctmaFit}.

## Examples

\begin{verbatim}
newStudyList <- ctmaFitToPrep(CoTiMAInitFit_3)
\end{verbatim}

## Description

Retrieves publication and citation information from google scholar based on the supplied author names and their google ID (user).

## Usage

\begin{verbatim}
ctmaGetPub(authorList = NULL, flush = FALSE, yearsToExclude = NULL)
\end{verbatim}

## Arguments

- \texttt{authorList}: \texttt{authorList = NULL}
- \texttt{flush}: \texttt{flush = FALSE}
- \texttt{yearsToExclude}: \texttt{yearsToExclude = NULL}
Arguments

authorList  list of authors and google scholar addresses
flush      if TRUE, the cache will be cleared and the data reloaded from Google.
yearsToExclude  the years to be excluded (default = current year)

Value

list with (cumulative) frequencies and (cumulative) citations in google scholar

Note

Set flush=TRUE only if retrieving is necessary (e.g., first retrieval on a day)

Examples

pubList_8 <- ctmaGetPub(authorList = list( c("J; de Jonge", "https://scholar.google.de/citations?hl=de&user=0q27IckAAAAJ"),
c("Arnold B.; Bakker", "user=FTl3bwUAAAAJ"),
c("Evangelia; Demerouti", "user=9mj5LvMAAAAJ"),
c("Joachim; Stoebber", "user=T9xVnuAAAAAJ"),
c("Claude; Fernet", "user=KwzjP4sAAAAJ"),
c("Frederic; Guay", "user=99vnhX4AAAAJ"),
c("Caroline; Senecal", "user=64ArFWQAAAAJ"),
c("Stéphanie; Austin", "user=PPyTI7EAAAAJ"),
flush=FALSE)
summary(pubList_8)

description

carmaInit

tarmaInit

description

Fits ctsem models to each primary study in the supplied list of primary studies prepared by ctmaPrep.

Usage

carmaInit(
    primaryStudies = NULL,
    activeDirectory = NULL,
    activateRPB = FALSE,
    checkSingleStudyResults = TRUE,
    digits = 4,
    n.latent = NULL,
    n.manifest = NULL,
    lambda = NULL,
ctmaInit

manifestVars = NULL,
drift = NULL,
indVarying = FALSE,
saveRawData = list(),
coresToUse = c(1),
silentOverwrite = FALSE,
saveSingleStudyModelFit = c(),
loadSingleStudyModelFit = c(),
scaleTI = NULL,
scaleTime = NULL,
optimize = TRUE,
nopriors = TRUE,
finishesamples = NULL,
chains = NULL,
iter = NULL,
verbose = NULL,
customPar = FALSE,
doPar = 1,
useSV = TRUE,
experimental = FALSE
)

Arguments

primaryStudies  list of primary study information created with ctmaPrep
activeDirectory defines another active directory than the one used in ctmaPrep
activateRPB set to TRUE to receive push messages with 'CoTiMA' notifications on your phone
checkSingleStudyResults Displays estimates from single study ctsem models and waits for user input to continue. Useful to check estimates before they are saved.
digits  number of digits used for rounding (in outputs)
n.latent number of latent variables of the model (has to be specified)
n.manifest number of manifest variables of the model (if left empty it will assumed to be identical with n.latent).
lambda R-type matrix with pattern of fixed (=1) or free (any string) loadings.
manifestVars define the error variances of the manifests with a single time point using R-type matrix with nrow=n.manifest & ncol=n.manifest.
drift labels for drift effects. Have to be either of the type V1toV2 or 0 for effects to be excluded, which is usually not recommended)
indVarying control for unobserved heterogeneity by having randomly (inter-individually) varying manifest means
saveRawData save (created pseudo) raw date. List: saveRawData$studyNumbers, $fileName, $row.names, col.names, $sep, $dec
coresToUse
if neg., the value is subtracted from available cores, else value = cores to use
silentOverwrite
overwrite old files without asking
saveSingleStudyModelFit
save the fit of single study ctsem models (could save a lot of time afterwards if the fit is loaded)
loadSingleStudyModelFit
load the fit of single study ctsem models
scaleTI
scale TI predictors
scaleTime
scale time (interval) - sometimes desirable to improve fitting
optimize
if set to FALSE, Stan's Hamiltonian Monte Carlo sampler is used (default = TRUE = maximum a posteriori / importance sampling).
nopriors
if TRUE, any priors are disabled - sometimes desirable for optimization
finishesamples
number of samples to draw (either from hessian based covariance or posterior distribution) for final results computation (default = 1000).
chains
number of chains to sample, during HMC or post-optimization importance sampling.
iter
number of iteration (default = 1000). Sometimes larger values could be required from Bayesian estimation
verbose
integer from 0 to 2. Higher values print more information during model fit - for debugging
customPar
logical. If set TRUE leverages the first pass using priors and ensure that the drift diagonal cannot easily go too negative (helps since ctsem > 3.4)
doPar
parallel and multiple fitting if single studies
useSV
if TRUE (default) start values will be used if provided in the list of primary studies
experimental
set TRUE to try new pairwise N function

Value

ctmAInit returns a list containing some arguments supplied, the fitted models, different elements summarizing the main results, model type, and the type of plot that could be performed with the returned object. The arguments in the returned object are activeDirectory, coresToUse, n.latent, n.manifest, and primaryStudyList. The study count is returned as n.studies, the created matrix of loadings of manifest on latent factors is returned as lambda, and a re-organized list of primary studies with some information omitted is returned as studyList. The fitted models for each primary study are found in studyFitList, which is a large list with many elements (e.g., the ctsem model specified by CoTiMA, the rstan model created by ctsem, the fitted rstan model etc.). Further results returned are emprawList (containing the pseudo raw data created), statisticsList (comprising basic stats such as average sample size, no. of measurement points, etc.), a list with modelResults (i.e., DRIFT=model_Drift_Coef, DIFFUSION=model_Diffusion_Coef, T0VAR=model_T0var_Coef, CINT=model_Cint_Coef), and the parameter names internally used. The summary list, which is printed if the summary function is applied to the returned object, comprises "estimates" (the aggregated effects), possible randomEffects (not yet fully working), confidenceIntervals, the minus2ll value and its n.parameters, and possible warning messages (message). Plot type is plot.type=c("drift") and model.type="stanct" ("omx" was deprecated).
# Fit a ctsem model to all three primary studies summarized in CoTiMAstudyList_3 and save the three fitted models
## Not run:
CoTiMAInitFit_3 <- ctmaInit(primaryStudies=CoTiMAstudyList_3,
n.latent=2,
checkSingleStudyResults=FALSE,
activeDirectory="/Users/tmp/") # adapt!

summary(CoTiMAInitFit_3)

## End(Not run)

### ctmaLabels

**Description**

used for consistent labeling of names and parameters

**Usage**

ctmaLabels(
  n.latent = NULL,
  n.manifest = 0,
  lambda = NULL,
  manifestVar = NULL,
  drift = NULL,
  invariantDrift = NULL,
  moderatedDrift = NULL,
  equalDrift = NULL
)

**Arguments**

- **n.latent**
- **n.manifest**
- **lambda**
- **manifestVar**
- **drift**
- **invariantDrift**
- **moderatedDrift**
- **equalDrift**

**Value**

returns consistently named parameters (e.g., "V1toV2") as well as their symbolic values, which are used to fix or free parameters when fitting a 'CoTiMA' model
Description

Initial fitting (i.e., applies ctmaInit) to a primary study reFit times to capitalize on chance for obtaining a hard-to-find optimal fit. This could be very helpful if a primary yields out-of-range estimates, which could happen if the fitting algorithm unfortunately used random start values that resulted in a locally but not globally optimal fit. Essentially, using ctmaOptimizeInit is like gambling, hoping that at least one set of starting values (the number is tries is specified in the reFits argument) enables finding the global optimal fit. On unix-like machines (e.g. MacOS), this could be done in parallel mode if coresToUse > 1.

Usage

cdmaOptimizeInit(
  primaryStudies = NULL,
  activeDirectory = NULL,
  problemStudy = NULL,
  reFits = NULL,
  n.latent = NULL,
  coresToUse = c(1),
  activateRPB = FALSE,
  checkSingleStudyResults = FALSE,
  customPar = TRUE
)

Arguments

primaryStudies list of primary study information created with ctmaPrep or ctmaFitToPrep
activeDirectory activeDirectory
problemStudy number (position in list) where the problem study in primaryStudies is found
reFits how many reFits should be done
n.latent number of latent variables of the model (has to be specified)!
coresToUse if neg., the value is subtracted from available cores, else value = cores to use
activateRPB set to TRUE to receive push messages with ‘CoTiMA’ notifications on your phone
checkSingleStudyResults displays estimates from single study ‘ctsem’ models and waits for user input to continue. Useful to check estimates before they are saved.
customPar logical. If set TRUE (default) leverages the first pass using priors and ensure that the drift diagonal cannot easily go too negative (helps since ctsem > 3.4)
Value
returns a list with bestFit (= the best fit achieved), all_minus2ll (= all -2ll values for all fitted models), and summary, which is printed if the summary function is applied to the returned object, and which shows the summary information of the ctsem model with the best fit.

Note
All but one of multiple cores are used on unix-type machines for parallel fitting.
During fitting, not output is generated. Be patient.

Examples
## Not run:
optimFit313 <- ctmaOptimizeInit(primaryStudies=CoTiMAstudyList_3,  
activeDirectory="/Users/tmp/", # adapt!  
problemStudy=which(CoTiMAstudyList_3$studYNumbers == 313),  
reFits=10,  
n.latent=2)

summary(optimFit313)

## End(Not run)
undoTimeScaling = TRUE,
...
)

Arguments

cdmaFitObject 'CoTiMA' Fit object
activeDirectory defines another active directory than the one used in cdmaInitFit
saveFilePrefix Prefix used for saved plots
activateRPR set to TRUE to receive push messages with 'CoTiMA' notifications on your phone
plotCrossEffects logical
plotAutoEffects logical
timeUnit label for x-axis when plotting discrete time plots
timeRange vector describing the time range for x-axis as sequence from/to/stepSize (e.g., c(1, 144, 1))
yLimitsForEffects range for y-axis
mod.number moderator number that should be used for plots
mod.values moderator values that should be used for plots
aggregateLabel label to indicate aggregated discrete time effects
xLabels labes used for x-axis
undoTimeScaling if TRUE, the original time scale is used (timeScale argument possibly used in cdmaInit is undone)
...
arguments passed through to plot()

Value

depending on the CoTiMA fit object supplied, generates funnel plots, forest plots, discrete time plots of autoregressive and cross-lagged effects, plots of required samples sizes across a range of discrete time intervals to achieve desired levels of statistical power, and post hoc power of primary studies. Plots are saved to disk.

Examples

## Not run:
# cannot run without proper activeDirectory specified. Adapt!
CoTiMAFullFit_3$activeDirectory <- "/Users/tmp/" # adapt!
plot(cdmaFitList(CoTiMAInitFit_3, CoTiMAFullFit_3),
timeUnit="Months", timeRange=c(1, 144, 1),
plotAutoEffects=FALSE)
ctmaPower

## End(Not run)

## Not run:
# cannot run without proper activeDirectory specified. Adapt!
CoTiMABiG_D_BO$activeDirectory <- "/Users/tmp/" # adapt!
plot(CoTiMABiG_D_BO)

## End(Not run)

cfmaPower  ctmaPower

description

Fits a full invariant model to a list of primary studies and performs analyses of expected (post hoc) power and required sample sizes.

Usage

cfmaPower(
thmaInitFit = NULL,
activeDirectory = NULL,
statisticalPower = c(),
failSafeN = NULL,
failSafeP = NULL,
timeRange = NULL,
useMBESS = FALSE,
coresToUse = 1,
digits = 4,
indVarying = FALSE,
activateRPB = FALSE,
silentOverwrite = FALSE,
loadAllInvFit = c(),
saveAllInvFit = c(),
loadAllInvWOSingFit = c(),
saveAllInvWOSingFit = c(),
skipScaling = TRUE,
useSampleFraction = NULL,
optimize = TRUE,
nopriors = TRUE,
finishesamples = NULL,
iter = NULL,
chains = NULL,
verbose = NULL,
customPar = TRUE
)

**Arguments**

- **ctmaInitFit**: object to which all single `ctsem` fits of primary studies has been assigned to (i.e., what has been returned by `ctmaInit`)
- **activeDirectory**: defines another active directory than the one used in `ctmaInit`
- **statisticalPower**: vector of requested statistical power values
- **failSafeN**: sample size used to determine across which time intervals effects become non-significant
- **failSafeP**: p-value used to determine across which time intervals effects become non-significant
- **timeRange**: vector describing the time range for x-axis as sequence from/to/stepSize (e.g., c(1, 144, 1))
- **useMBESS**: use 'MBESS' package to calculate statistical power (slower)
- **coresToUse**: if negative, the value is subtracted from available cores, else value = cores to use
- **digits**: number of digits used for rounding (in outputs)
- **indVarying**: Allows continuous time intercepts to vary at the individual level (random effects model, accounts for unobserved heterogeneity)
- **activateRPB**: set to TRUE to receive push messages with 'CoTiMA' notifications on your phone
- **silentOverwrite**: overwrite old files without asking
- **loadAllInvFit**: load the fit of fully constrained 'CoTiMA' model
- **saveAllInvFit**: save the fit of fully constrained 'CoTiMA' model
- **loadAllInvWOSingFit**: load series of fits of fully constrained 'CoTiMA' model with single cross effects excluded, respectively
- **saveAllInvWOSingFit**: save series of fits of fully constrained 'CoTiMA' model with single cross effects excluded, respectively
- **skipScaling**: does not (re-)scale raw data (re-scaling of imported pseudo raw data achieves correlations = 1)
- **useSampleFraction**: to speed up debugging. Provided as fraction (e.g., 1/10)
- **optimize**: if set to FALSE, Stan’s Hamiltonian Monte Carlo sampler is used (default = TRUE = maximum a posteriori / importance sampling).
- **nopriors**: if TRUE, any priors are disabled – sometimes desirable for optimization
- **finishesamples**: number of samples to draw (either from hessian based covariance or posterior distribution) for final results computation (default = 1000).
- **iter**: number of iterations (default = 1000). Sometimes larger values could be required from Bayesian estimation
- **chains**: number of chains to sample, during HMC or post-optimization importance sampling.
verbose integer from 0 to 2. Higher values print more information during model fit – for debugging

customPar logical. If set TRUE (default) leverages the first pass using priors and ensure that the drift diagonal cannot easily go too negative (helps since ctsem > 3.4)

Value

crmaPower returns a list containing some arguments supplied, a fitted model with all (!) parameters invariant across primary studies, different elements summarizing the main results, model type, and the type of plot that could be performed with the returned object. The arguments in the returned object are activeDirectory, coresToUse, n.latent, n.manifest, and primaryStudyList. A further result returned is n.studies = 1 (required for proper plotting). Further arguments, which are just copied from the init-fit object supplied, are, n.latent, studyList, and the statisticsList. The fitted model is found in studyFitList, which is a large list with many elements (e.g., the ctsem model specified by CoTiMA, the rstan model created by ctsem, the fitted rstan model etc.). Further results returned are a list with modelResults (i.e., DRIFT=DRIFT, DIFFUSION=DIFFUSION, T0VAR=T0VAR, CINT=NULL) and the parameter names internally used. The summary list, which is printed if the summary function is applied to the returned object, contains "estimates", which is itself a list comprising "Estimates of Model with all Effects Invariant", "Requested Statistical Power" (which just returns the argument statisticalPower), "Power (post hoc) for Drift Effects", "Required Sample Sizes" "Effect Sizes (based on discrete-time calcs; used for power calcs.)", and "Range of significant effects" (across which intervals effects were significant). Plot type is plot.type=c("power") and model.type="stanct" ("omx" was deprecated).

Examples

## Not run:
CoTiMAInitFit_D_BO$activeDirectory <- "/Users/tmp/" # adapt!
CoTiMAPower_D_BO <- crmaPower(ctmaInitFit=CoTiMAInitFit_D_BO,
    statisticalPower = c(.50, .80, .95),
    finishsamples = 10000)

summary(CoTiMAPower_D_BO)

## End(Not run)
Usage

```r
c DMA PRaw(
    empCovMat = NULL,
    empNMat = matrix(0, 0, 0),
    empN = NULL,
    studyNumber = NULL,
    empMeanVector = NULL,
    empVarVector = NULL,
    activateRPB = FALSE,
    experimental = FALSE
)
```

Arguments

- **empCovMat**: empirical primary study covariance matrix
- **empNMat**: matrix of (possibly pairwise) N
- **empN**: N (in case of listwise N)
- **studyNumber**: internal number
- **empMeanVector**: vector of means for all variables, usually 0
- **empVarVector**: vector of variances for all variables, usually 1
- **activateRPB**: set TRUE to receive push messages with 'CoTiMA' notifications on your phone
- **experimental**: set TRUE to try new pairwise N function

Description

Combines information of primary studies into a list object and returns this list. This list is then used as input to fit 'ctsem' models. Primary study information is expected to be assigned to 'numbered' objects. Some of these objects are pre-defined (e.g., 'empcov', 'ageM'). Most of the pre-defined objects could be empty, or they could be dropped by entering their names in the excludedElements-object (e.g., excludedElements = c('ageM')), but dropping them is not really necessary. Additional elements could also be added, which could be useful to put together all information about primary studies at the convenience of the researcher.

Usage

```r
c DMA Prep(
    selectedStudies = NULL,
    excludedElements = NULL,
    addElements = NULL,
    digits = 4,
    moderatorLabels = NULL,
```
ctmaPrep

moderatorValues = NULL,
summary = TRUE,
activeDirectory = NULL
)

Arguments

selectedStudies
Vector of primary study numbers (numeric values with no leading 0; e.g., '2'
but not '02')

excludedElements
Vector of predefined objects used to code primary study information. Some
predefined objects are strongly defined; they have to be used in a special way
because they are actually used in subsequent analyses. Some other objects could
be used at the researcher's convenience (information is just collected). Strongly
predefined objects are 'delta_t' (vector of time intervals; the only mandatory
requirement; should be of the type c(NA, NA) in cases when raw data are pro-
vided), 'sampleSize' (single number), 'pairwiseN' (matrix of pairwise N; could
be used if correlation matrix is based on pairwise N), 'empcov' (correlation
matrix), 'moderator' (vector of numbers; could be continuous or categorical),
'startValues' (vector of start values), 'rawData' (information about file name
and structure of raw data), 'empMeans' (means for variables; usually 0), and
'empVars' (variances for variables; usually 1). Weakly predefined objects are
'studyNumber' (intended as a special number used for the outputs of subse-
quently fitted CoTiMA models), 'source' (intended as vector of authors' names
and publication year), 'ageM' (intended as value indicating the mean age of
participants in a primary study), 'malePercent' (intended as value indicating
the percentage of male participants in a primary study), 'occupation' (intended
as vector of character strings representing the occupations of participants in a
primary study), 'country' (intended as single character string representing the
country in which a primary study was conducted), 'alphas' (intended as vector
of Cronbach's alphas of the variables of a primary study; not yet functional),
and 'targetVariables' (intended as vector of character strings representing informa-
tion about the variables used).

addElements
User-added objects that are handled as the weakly predefined objects. The major
purpose is to collect information a researcher regards as important.

digits
Rounding used for summary function

 moderatorLabels
character vector of names

 moderatorValues
list of character vectors

 summary
if TRUE (default) creates summary table and xlsx sheets. Could be set to FALSE
in case of errors.

 activeDirectory
Mandatory. If subsequent fitting is done using different folders or on different
computers, it can be changed so that raw data files can be loaded.
Value

List of primary studies and parameters for the following CoTiMA (plus StudyInformation which could be saved to Excel)

Note

The following example shows information a researcher has about three studies, which have the numbers '2', '4' and '17'. All information about these studies are stored in objects ending with '2', '4', and '17', respectively. In most instances, one relevant piece of information is the empirical correlation (or covariance) matrix reported in this study, which is stored in the objects 'empcov2', 'empcov4', and 'empcov17'. Note that full and symmetric matrices are required for ctmaPrep. Usually, sample sizes ('sampleSize2', 'sampleSize4', & 'sampleSize17') and time lags ('delta_t2', 'delta_t4', & 'delta_t17'), are required, too.

Examples

# First Study
empcov2 <- matrix(c(1.00, 0.45, 0.57, 0.18, 
                    0.45, 1.00, 0.31, 0.66, 
                    0.57, 0.31, 1.00, 0.40, 
                    0.18, 0.66, 0.40, 1.00), nrow=4, ncol=4)
delta_t2 <- 12
sampleSize2 <- 148
moderator2 <- c(1, 0.72)
source2 <- c("Houkes, I,"", "Janssen, P, P, M,"", "de Jonge, J", 
              "& Bakker, A, B", "Study1", "2003")
addedByResearcher2 <- "something you want to add"

# Second Study
empcov3 <- matrix(c(1.00, 0.43, 0.71, 0.37, 
                    0.43, 1.00, 0.34, 0.69, 
                    0.71, 0.34, 1.00, 0.50, 
                    0.37, 0.69, 0.50, 1.00), nrow=4, ncol=4)
delta_t3 <- 12
sampleSize3 <- 88
moderator3 <- c(1, 0.72)
source3 <- c("Houkes, I,"", "Janssen, P, P, M,"", "de Jonge, J", 
              "& Bakker, A, B", "Study2", "2003")
addedByResearcher3 <- ""

# Third Study
empcov313 <- matrix(c(1.00, 0.38, 0.54, 0.34, 0.60, 0.28, 
                      0.38, 1.00, 0.34, 0.68, 0.28, 0.68, 
                      0.54, 0.34, 1.00, 0.47, 0.66, 0.39, 
                      0.34, 0.68, 0.47, 1.00, 0.38, 0.72, 
                      0.60, 0.28, 0.66, 0.38, 1.00, 0.38, 
                      0.28, 0.68, 0.39, 0.72, 0.38, 1.00), nrow=6, ncol=6)
delta_t313 <- c(1.5, 1.5)
sampleSize313 <- 335
moderator313 <- c(0.8, 2.47)
source313 <- c("Demerouti", "Bakker", & Bulters", "2004")
```
addedByResearcher313 <- "check correlation matrix"

# Add Labels and Values for Moderators (just for optional excel tables)
moderatorLabels <- c("Control", "Social Support")
moderatorValues <- list("continuous", c("1 = very low", "2 = low",
            "3 = medium", "4 = high", "5 = very high"))

CoTiMAstudyList_3 <- ctmaPrep(selectedStudies = c(2, 3, 313),
                               activeDirectory="/user/",
                               excludedElements="ageM",
                               addElements="addedByResearcher",
                               moderatorLabels=moderatorLabels,
                               moderatorValues=moderatorValues)
```

---

**ctmaPub**

**Description**

Compute publication and citation scores for studies based on the (team of) authors’ publication scores.

**Usage**

```r
cdmaPub(
  getPubObj = NULL,
  primaryStudyList = NULL,
  yearsToExclude = 0,
  recency = 5,
  targetYear = NULL,
  indFUN = "sum",
  colFUN = "mean",
  addAsMod = FALSE
)
```

**Arguments**

- **getPubObj** publication information compiled with `ctmaGetPub`
- **primaryStudyList** vector with numbers of studies (e.g., c(1,3); requires source1 and source3 to be available)
- **yearsToExclude** years to exclude from publications
- **recency** years before `targetYear` that are considered for recency analysis
- **targetYear** year (default = last year) after which publications are ignored
- **indFUN** function (default = sum) how publications of each author within a collective (team) are summarized
coLFUN     function (default = mean) how publications all authors of collective (team) are summarized
addAsMod   currently disabled. Add to existing moderator objects (or create them) in primaryStudyList, which is part of the returned object

Value

returns NEPP (= the \*number\* of studies published by the authors of the primary studies supplied UNTIL the year when the primary study was published), NEPPRecency (like NEPP, but limited to the number of years before the publication as specified with the recency argument), "Meaning of NEPP" and "Meaning of NEPPRecency" which explain what \*number\* exactly means (e.g., could be the mean of the sum of each author's publication, or the sum of the maximum publications per year of the authors), and "primaryStudyList(full)", which just returns the primaryStudyList supplied).

Examples

pubResults_6 <- ctmaPub(getPubObj=pubList_8,
                        primaryStudyList=CoTiMAstudyList_6)
summary(pubResults_6)

---

Description

Internal function to save files

Usage

ctmaSaveFile(
  activateRPB, 
  activeDirectory = activeDirectory, 
  SaveObject, 
  FileName, 
  Directory, 
  silentOverwrite = FALSE 
)

Arguments

activateRPB     set TRUE to receive push messages with 'CoTiMA' notifications on your phone
activeDirectory directory name
ctmaStanResample

Parameters

- `SaveObject`: object to save
- `FileName`: filename
- `Directory`: directory to save file in
- `silentOverwrite`: override old files without asking

Value

No return value. Just saves files

Description

Re-sample from a fitted stanct model to achieve desired number of finishesamples (could be useful to prevent exhausted memory)

Usage

```r
cdmaStanResample(ctmaFittedModel = NULL, nsamples = 25, overallSamples = 500)
```

Arguments

- `ctmaFittedModel`: a 'CoTiMA' fit object, usually with few 'finishesamples' to prevent memory exhaustion
- `nsamples`: sample size per run
- `overallSamples`: overall samples size to be achieved

Value

Returns a CoTiMA fit object with an increased number of finish samples
Description

derives start values by average discrete time SEM effects, converting them to continuous time, and inversely apply transformations used by 'ctsem'

Usage

cdmaSV(
  ctmaInitFit = NULL,
  activeDirectory = NULL,
  primaryStudies = NULL,
  coresToUse = 1,
  replaceSV = TRUE
)

Arguments

cdmaInitFit object to which all single 'ctsem' fits of primary studies has been assigned to (i.e., what has been returned by cdmaInit)
activeDirectory defines another active directory than the one used in cdmaInit
primaryStudies if cdmaInitFit does not contain the primaryStudies object created with cdmaPrep it could be added
coresToUse if negative, the value is subtracted from available cores, else value = cores to use
replaceSV if TRUE replaces startValues in primaryStudies, else it saves them as list element inits

Value

returns a modified list of primary studies with starting values added or replaced

Examples

## Not run:
newPrimaryStudyList <- cdmaSV(ctmaInitFit=CoTMAInitFit_6)

## End(Not run)
**delta_t128**

*delta_t128 example vector*

**Description**

delta_t128 example vector

**Usage**

delta_t128

**Format**

An object of class numeric of length 1.

**Author(s)**

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>

---

**delta_t18**

*delta_t18 example vector*

**Description**

delta_t18 example vector

**Usage**

delta_t18

**Format**

An object of class numeric of length 1.

**Author(s)**

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>
Description

delta_t2 example vector

Usage

delta_t2

Format

An object of class numeric of length 1.

Author(s)

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>

---

Description

delta_t201 example vector

Usage

delta_t201

Format

An object of class numeric of length 2.

Author(s)

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>
**delta_t3**

*delta_t3 example vector*

**Description**

delta_t3 example vector

**Usage**

delta_t3

**Format**

An object of class numeric of length 1.

**Author(s)**

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>

---

**delta_t313**

*delta_t313 example vector*

**Description**

delta_t313 example vector

**Usage**

delta_t313

**Format**

An object of class numeric of length 2.

**Author(s)**

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>
delta_t32  
\textit{delta_t32 example vector}

\section*{Description}

\textit{delta_t32 example vector}

\section*{Usage}

\texttt{delta_t32}

\section*{Format}

An object of class \texttt{numeric} of length 1.

\section*{Author(s)}

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>

\begin{verbatim}

demands128

demands128 example vector

\section*{Description}

\textit{demands128 example vector}

\section*{Usage}

\texttt{demands128}

\section*{Format}

An object of class \texttt{character} of length 1.

\section*{Author(s)}

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>
\end{verbatim}
demands18

** demands18 example vector **

---

**Description**

demands18 example vector

**Usage**

demands18

**Format**

An object of class character of length 1.

**Author(s)**

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>

---

demands2

** demands2 example vector **

---

**Description**

demands2 example vector

**Usage**

demands2

**Format**

An object of class character of length 1.

**Author(s)**

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>
demands201  

**Description**  

demands201 example vector

**Usage**  

demands201

**Format**  

An object of class character of length 1.

**Author(s)**  

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>


demands3  

**Description**  

demands3 example vector

**Usage**  

demands3

**Format**  

An object of class character of length 1.

**Author(s)**  

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>
demands313

demands313 example vector

Description
demands313 example vector

Usage
demands313

Format
An object of class character of length 1.

Author(s)
C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>

demands32

demands32 example vector

Description
demands32 example vector

Usage
demands32

Format
An object of class character of length 1.

Author(s)
C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>
### dl_link

**Description**

*dl_link example path*

**Usage**

*dl_link*

**Format**

An object of class *character* of length 1.

**Author(s)**

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>

### empcov128

**Description**

*empcov128 example matrix*

**Usage**

*empcov128*

**Format**

An object of class *list* of length 2.

**Author(s)**

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>
empcov18

Description
empcov18 example matrix

Usage
empcov18

Format
An object of class matrix (inherits from array) with 4 rows and 4 columns.

Author(s)
C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>

empcov2

Description
empcov2 example matrix

Usage
empcov2

Format
An object of class matrix (inherits from array) with 4 rows and 4 columns.

Author(s)
C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>
empcov201 example matrix

Description

empcov201 example matrix

Usage

empcov201

Format

An object of class matrix (inherits from array) with 6 rows and 6 columns.

Author(s)

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>

empcov3 example matrix

Description

empcov3 example matrix

Usage

empcov3

Format

An object of class matrix (inherits from array) with 4 rows and 4 columns.

Author(s)

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>
empcov313 example matrix

Description
empcov313 example matrix

Usage
empcov313

Format
An object of class matrix (inherits from array) with 6 rows and 6 columns.

Author(s)
C. Dormann & M. Homburg <CoTIMA@uni-mainz.org>

empcov32 example matrix

Description
empcov32 example matrix

Usage
empcov32

Format
An object of class matrix (inherits from array) with 4 rows and 4 columns.

Author(s)
C. Dormann & M. Homburg <CoTIMA@uni-mainz.org>
malePercent128  

**Description**  
malePercent128 example vector  

**Usage**  
malePercent128  

**Format**  
An object of class numeric of length 1.

**Author(s)**  
C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>  

malePercent18  

**Description**  
malePercent18 example vector  

**Usage**  
malePercent18  

**Format**  
An object of class numeric of length 1.

**Author(s)**  
C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>
**malePercent2**

<table>
<thead>
<tr>
<th>malePercent2</th>
<th>malePercent2 example vector</th>
</tr>
</thead>
</table>

**Description**

malePercent2 example vector

**Usage**

malePercent2

**Format**

An object of class numeric of length 1.

**Author(s)**

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>

---

**malePercent201**

<table>
<thead>
<tr>
<th>malePercent201</th>
<th>malePercent201 example vector</th>
</tr>
</thead>
</table>

**Description**

malePercent201 example vector

**Usage**

malePercent201

**Format**

An object of class numeric of length 1.

**Author(s)**

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>
Description

malePercent3 example vector

Usage

malePercent3

Format

An object of class numeric of length 1.

Author(s)

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>

Description

malePercent313 example vector

Usage

malePercent313

Format

An object of class numeric of length 1.

Author(s)

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>
malePercent32

malePercent32 example vector

Description

malePercent32 example vector

Usage

malePercent32

Format

An object of class numeric of length 1.

Author(s)

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>

moderator128

moderator128 example vector

Description

moderator128 example vector

Usage

moderator128

Format

An object of class numeric of length 2.

Author(s)

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>
moderator18  

moderator18 example vector

Description
moderator18 example vector

Usage
moderator18

Format
An object of class numeric of length 2.

Author(s)
C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>

moderator2  

moderator2 example vector

Description
moderator2 example vector

Usage
moderator2

Format
An object of class numeric of length 2.

Author(s)
C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>
moderator201

moderator201 example vector

Description
moderator201 example vector

Usage
moderator201

Format
An object of class numeric of length 2.

Author(s)
C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>

moderator3

moderator3 example vector

Description
moderator3 example vector

Usage
moderator3

Format
An object of class numeric of length 2.

Author(s)
C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>
moderator313  moderator313 example vector

Description
moderator313 example vector

Usage
moderator313

Format
An object of class numeric of length 2.

Author(s)
C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>

moderator32  moderator32 example vector

Description
moderator32 example vector

Usage
moderator32

Format
An object of class numeric of length 2.

Author(s)
C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>
moderatorLabels

moderatorLabels example vector

Description

moderatorLabels example vector

Usage

moderatorLabels

Format

An object of class character of length 2.

Author(s)

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>

moderatorValues

moderatorValues example vector

Description

moderatorValues example vector

Usage

moderatorValues

Format

An object of class list of length 2.

Author(s)

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>
Description

occupation128 example vector

Usage

occupation128

Format

An object of class character of length 1.

Author(s)

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>

Description

occupation18 example vector

Usage

occupation18

Format

An object of class character of length 1.

Author(s)

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>
occupation2

Description

occupation2 example vector

Usage

occupation2

Format

An object of class character of length 1.

Author(s)

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>

occupation201

Description

occupation201 example vector

Usage

occupation201

Format

An object of class character of length 1.

Author(s)

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>
occupation3

occupation3 example vector

**Description**

occupation3 example vector

**Usage**

occupation3

**Format**

An object of class character of length 1.

**Author(s)**

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>

occupation313

occupation313 example vector

**Description**

occupation313 example vector

**Usage**

occupation313

**Format**

An object of class character of length 1.

**Author(s)**

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>
### occupation32

**Description**

occupation32 example vector

**Usage**

occupation32

**Format**

An object of class character of length 1.

**Author(s)**

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>

---

### pairwiseN128

**Description**

pairwiseN128 example vector

**Usage**

pairwiseN128

**Format**

An object of class list of length 2.

**Author(s)**

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>
Description

call ctmaPlot if a CoTiMAFit object is supplied to plot()

Usage

## S3 method for class 'CoTiMAFit'
plot(x, ...)

Arguments

x     list
...
... further arguments to be passed through to summary()

Value

returns a call to 'ctmaPlot', which is used to plot CoTiMA fit objects

Description

pubList_8 example list

Usage

pubList_8

Format

An object of class CoTiMAFit of length 9.

Author(s)

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>
rawData128

**Description**

rawData128 example list

**Usage**

rawData128

**Format**

An object of class list of length 7.

**Author(s)**

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>

---

recodeVariables128

**Description**

recodeVariables128 example vector

**Usage**

recodeVariables128

**Format**

An object of class character of length 2.

**Author(s)**

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>
results128  

**Description**

results128 example list

**Usage**

results128

**Format**

An object of class list of length 2.

**Author(s)**

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>

sampleSize128  

**Description**

sampleSize128 example vector

**Usage**

sampleSize128

**Format**

An object of class NULL of length 0.

**Author(s)**

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>
sampleSize18  

Description  
sampleSize18 example vector  

Usage  
sampleSize18  

Format  
An object of class numeric of length 1.  

Author(s)  
C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>  

sampleSize2  

Description  
sampleSize2 example vector  

Usage  
sampleSize2  

Format  
An object of class numeric of length 1.  

Author(s)  
C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>
sampleSize201 example vector

Description

sampleSize201 example vector

Usage

sampleSize201

Format

An object of class numeric of length 1.

Author(s)

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>

sampleSize3 example vector

Description

sampleSize3 example vector

Usage

sampleSize3

Format

An object of class numeric of length 1.

Author(s)

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>
Description

sampleSize313 example vector

Usage

sampleSize313

Format

An object of class numeric of length 1.

Author(s)

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>

Description

sampleSize32 example vector

Usage

sampleSize32

Format

An object of class numeric of length 1.

Author(s)

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>
source128  source128 example vector

Description
source128 example vector

Usage
source128

Format
An object of class character of length 4.

Author(s)
C. Dormann & M. Homburg &lt;CoTiMA@uni-mainz.org&gt;

source2  source2 example vector

Description
source2 example vector

Usage
source2

Format
An object of class character of length 6.

Author(s)
C. Dormann & M. Homburg &lt;CoTiMA@uni-mainz.org&gt;
source201  source201 example vector

Description

source201 example vector

Usage

source201

Format

An object of class character of length 6.

Author(s)

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>

source3  source3 example vector

Description

source3 example vector

Usage

source3

Format

An object of class character of length 6.

Author(s)

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>
source313  

**Description**

source313 example vector

**Usage**

source313

**Format**

An object of class character of length 4.

**Author(s)**

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>

---

**Description**

defines summary for 'CoTiMA' fit objects

**Usage**

```r
## S3 method for class 'CoTiMAFit'
summary(object, ...)
```

**Arguments**

- `object` one CoTiMAFit object or more as ctmaFitList(object1, object2, ...)
- `...` further arguments to be passed through to summary()

**Value**

returns a printed summary of a 'CoTiMA' fit object
Description
targetVariables128 example vector

Usage
targetVariables128

Format
An object of class character of length 7.

Author(s)
C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>

Description
targetVariables2 example vector

Usage
targetVariables2

Format
An object of class character of length 4.

Author(s)
C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>
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**Description**

targetVariables3 example vector

**Usage**

targetVariables3

**Format**

An object of class character of length 4.

**Author(s)**

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>

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</table>

**Description**

targetVariables313 example vector

**Usage**

targetVariables313

**Format**

An object of class character of length 6.

**Author(s)**

C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>
variableNames128

variableNames128 example vector

Description
variableNames128 example vector

Usage
variableNames128

Format
An object of class character of length 9.

Author(s)
C. Dormann & M. Homburg <CoTiMA@uni-mainz.org>
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