Package 'manCTMed'

July 29, 2025

```
Title Continuous Time Mediation
Version 1.0.9
Description Research compendium for the manuscript
     Pesigan, I. J. A., Russell, M. A., & Chow, S.-M. (2025).
     Inferences and Effect Sizes for Direct, Indirect, and Total Effects
     in Continuous-Time Mediation Models.
     Psychological Methods.
     <doi:10.0000/0000000000>.
URL https://github.com/jeksterslab/manCTMed,
     https://jeksterslab.github.io/manCTMed/, https://osf.io/qwnmf/,
     https://doi.org/10.0000/0000000000
BugReports https://github.com/jeksterslab/manCTMed/issues
License MIT + file LICENSE
Encoding UTF-8
LazyData true
LazyDataCompression xz
Roxygen list(markdown = TRUE)
Depends R (>= 4.0.0)
Imports stats, dynr, OpenMx, dynUtils, simStateSpace (== 1.2.9),
     bootStateSpace (== 1.0.2), cTMed (== 1.0.6), ggplot2
Suggests knitr, rmarkdown, testthat, DT
Remotes jeksterslab/dynUtils@dc3f47b
RoxygenNote 7.3.2
NeedsCompilation no
Author Ivan Jacob Agaloos Pesigan [aut, cre, cph] (ORCID:
       <https://orcid.org/0000-0003-4818-8420>),
     Michael A. Russell [ctb] (ORCID:
       <https://orcid.org/0000-0002-3956-604X>),
     Sy-Miin Chow [ctb] (ORCID: <a href="https://orcid.org/0000-0003-1938-027X">https://orcid.org/0000-0003-1938-027X</a>)
Maintainer Ivan Jacob Agaloos Pesigan <r.jeksterslab@gmail.com>
```

2 Contents

Contents

BootPara 4
BootParaStdXMY
BootParaStdXYM
BootParaStdYMX
BootParaXMY
BootParaXYM
BootParaYMX
Compress
DeltaStdXMY
DeltaStdXYM
DeltaStdYMX
DeltaXMY
DeltaXYM
DeltaYMX
FigPlotEffects
FigScatterPlotCoverage
FigScatterPlotPower
FigScatterPlotSeBias
FigScatterPlotType1
FitDynr
FitMx
GenData
IllustrationBootPara
IllustrationCompress
IllustrationFigPlotEffects
IllustrationFigScatterPlotCoverage
IllustrationFigScatterPlotPower
IllustrationFigScatterPlotSeBias
IllustrationFitDynr
IllustrationFitMx
IllustrationGenData
IllustrationMCPhiSigma
IllustrationPrepData
illustration_dist
illustration_dist_dt
illustration_dist_dt_mc
illustration_dist_mc
illustration_dist_med
illustration_dist_med_mc
illustration_dist_med_std
illustration dist med std mc
illustration results
MCStdXMY
MCStdXYM
MCStdYMX
MCXMY 40

Contents 3

MCXYM	
MCYMX	
params	43
PhiHat	43
RandomMeasurement	44
results	45
Sim	
SimDynrBootPara	47
SimDynrBootParaStdXMY	
SimDynrBootParaStdYMX	
SimDynrBootParaXMY	
SimDynrBootParaYMX	
SimDynrDeltaStdXMY	
SimDynrDeltaStdYMX	
SimDynrDeltaXMY	
SimDynrDeltaYMX	
SimDynrMCStdXMY	
SimDynrMCStdYMX	
SimDynrMCXMY	
SimDynrMCYMX	
SimFitDynr	
SimFitMx	
SimFN	
SimGenData	
SimIllustration	
SimIllustrationDynrBootPara	
SimIllustrationDynrBootParaStdXMY	
SimIllustrationDynrBootParaXMY	
SimIllustrationDynrDeltaStdXMY	
SimIllustrationDynrDeltaXMY	
SimIllustrationDynrMCPhiSigma	
SimIllustrationDynrMCStdXMY	
SimillustrationDynrMCXMY	
SimillustrationFitDynr	
SimilustrationFitMx	
SimIllustrationGenData	
SimIllustrationPara	
SimPara	
SimProj	
Sum	
SumDynrDeltaStdXMY	
SumDynrDeltaStdYMX	
SumDynrDeltaXMY	
SumDynrDeltaYMX	
SumDynrMCStdXMY	
SumDynrMCStdYMX	
SumDynrMCXMY	
SumDynrMCYMX	83

BootPara BootPara

83
84
85
86
87
88
88
89
90
91
92

BootPara

Parametric Bootstrap

Description

The function generates simulated datasets based on a fitted model and refits the model to each generated dataset using the dynr package.

Usage

```
BootPara(
  fit,
  path,
  prefix,
  taskid,
  B = 1000L,
  ncores = NULL,
  seed = NULL,
  clean = TRUE
)
```

Arguments

fit	R object. Output of the FitDynr(), FitMx(), IllustrationFitDynr(), or IllustrationFitMx(), functions.
path	Path to a directory to store bootstrap samples and estimates.
prefix	Character string. Prefix used for the file names for the bootstrap samples and estimates.
taskid	Positive integer. Task ID.
В	Positive integer. Number of bootstrap samples.
ncores	Positive integer. Number of cores to use.
seed	Integer. Random seed.
clean	Logical. If clean = TRUE, delete intermediate files generated by the function.

BootParaStdXMY 5

See Also

Other Confidence Interval Functions: BootParaStdXMY(), BootParaStdXYM(), BootParaStdYMX(), BootParaXYM(), BootParaXYM(), BootParaXYM(), DeltaStdXMY(), DeltaStdXMY(), DeltaStdXMY(), DeltaStdXMY(), DeltaXYM(), DeltaXYM(), IllustrationBootPara(), MCStdXMY(), MCStdXYM(), MCStdXMY(), MCXYM(), MCXYM(), MCYMX()

Examples

```
## Not run:
set.seed(42)
library(dynr)
sim <- GenData(taskid = 1)
data <- RandomMeasurement(sim)
fit <- FitDynr(data, taskid = 1)
BootPara(
  fit = fit,
  path = getwd(),
  prefix = "pb",
  taskid = 1,
  B = 1000L
)
## End(Not run)</pre>
```

BootParaStdXMY

Parametric Bootstrap Confidence Intervals for X-M-Y (Standardized)

Description

The function generates parametric bootstrap method confidence intervals for the mediation model $X \to M \to Y$ (Standardized).

Usage

```
BootParaStdXMY(boot, theta_hat, delta_t = 1:30, ncores = NULL)
```

Arguments

boot R object. Output of the BootPara() function.
theta_hat R object. Output of the ThetaHat() function.
delta_t Numeric vector. Vector of time intervals.
ncores Positive integer. Number of cores to use.

```
Other Confidence Interval Functions: BootPara(), BootParaStdXYM(), BootParaStdYMX(), BootParaXMY(), BootParaXYM(), BootParaYMX(), DeltaStdXMY(), DeltaStdXYM(), DeltaStdYMX(), DeltaXMY(), DeltaXMY(), DeltaXMY(), MCStdXYM(), MCStdXYM(), MCStdXYM(), MCStdXYM(), MCXMY(), MCXMY(), MCXMX()
```

6 BootParaStdXYM

Examples

```
## Not run:
set.seed(42)
library(dynr)
sim <- GenData(taskid = 1)</pre>
data <- RandomMeasurement(sim)</pre>
fit <- FitDynr(data, taskid = 1)</pre>
boot <- BootPara(</pre>
  fit = fit,
  path = getwd(),
  prefix = "pb",
  taskid = 1,
  B = 1000L
)
theta_hat <- ThetaHat(fit)</pre>
ci <- BootParaStdXMY(boot = boot, theta_hat = theta_hat)</pre>
plot(ci)
plot(ci, type = "bc")
## End(Not run)
```

BootParaStdXYM

Parametric Bootstrap Confidence Intervals for X-Y-M (Standardized)

Description

The function generates parametric bootstrap method confidence intervals for the mediation model $X \to Y \to M$ (Standardized).

Usage

```
BootParaStdXYM(boot, theta_hat, delta_t = 1:30, ncores = NULL)
```

Arguments

```
boot R object. Output of the BootPara() function.
theta_hat R object. Output of the ThetaHat() function.
delta_t Numeric vector. Vector of time intervals.
ncores Positive integer. Number of cores to use.
```

```
Other Confidence Interval Functions: BootPara(), BootParaStdXMY(), BootParaStdYMX(), BootParaXMY(), BootParaXYM(), BootParaYMX(), DeltaStdXMY(), DeltaStdXMY(), DeltaStdYMX(), DeltaXMY(), DeltaXMY(), DeltaXMY(), MCStdXMY(), MCStdXMY(), MCStdXMY(), MCStdXMX(), MCXMY(), MCXMY(), MCXMX()
```

BootParaStdYMX 7

Examples

```
## Not run:
set.seed(42)
library(dynr)
sim <- GenData(taskid = 1)
data <- RandomMeasurement(sim)</pre>
fit <- FitDynr(data, taskid = 1)</pre>
boot <- BootPara(</pre>
  fit = fit,
  path = getwd(),
  prefix = "pb",
  taskid = 1,
  B = 1000L
)
theta_hat <- ThetaHat(fit)</pre>
ci <- BootParaStdXYM(boot = boot, theta_hat = theta_hat)</pre>
plot(ci)
plot(ci, type = "bc")
## End(Not run)
```

BootParaStdYMX

Parametric Bootstrap Confidence Intervals for Y-M-X (Standardized)

Description

The function generates parametric bootstrap method confidence intervals for the mediation model $Y \to M \to X$ (Standardized).

Usage

```
BootParaStdYMX(boot, theta_hat, delta_t = 1:30, ncores = NULL)
```

Arguments

```
boot R object. Output of the BootPara() function.
theta_hat R object. Output of the ThetaHat() function.
delta_t Numeric vector. Vector of time intervals.
ncores Positive integer. Number of cores to use.
```

```
Other Confidence Interval Functions: BootPara(), BootParaStdXMY(), BootParaStdXYM(), BootParaXMY(), BootParaXYM(), BootParaYMX(), DeltaStdXMY(), DeltaStdXYM(), DeltaStdYMX(), DeltaXMY(), DeltaXMY(), DeltaXMY(), MCStdXYM(), MCStdXYM(), MCStdXYM(), MCStdXYM(), MCXMY(), MCXMY(), MCXMX()
```

8 BootParaXMY

Examples

```
## Not run:
set.seed(42)
library(dynr)
sim <- GenData(taskid = 1)</pre>
data <- RandomMeasurement(sim)</pre>
fit <- FitDynr(data, taskid = 1)</pre>
boot <- BootPara(</pre>
  fit = fit,
  path = getwd(),
  prefix = "pb",
  taskid = 1,
  B = 1000L
)
theta_hat <- ThetaHat(fit)</pre>
ci <- BootParaStdYMX(boot = boot, theta_hat = theta_hat)</pre>
plot(ci)
plot(ci, type = "bc")
## End(Not run)
```

BootParaXMY

Parametric Bootstrap Confidence Intervals for X-M-Y

Description

The function generates parametric bootstrap method confidence intervals for the mediation model $X \to M \to Y$.

Usage

```
BootParaXMY(boot, phi_hat, delta_t = 1:30, ncores = NULL)
```

Arguments

```
boot R object. Output of the BootPara() function.

phi_hat R object. Output of the PhiHat() function.

delta_t Numeric vector. Vector of time intervals.

ncores Positive integer. Number of cores to use.
```

```
Other Confidence Interval Functions: BootPara(), BootParaStdXMY(), BootParaStdXYM(), BootParaStdYMX(), BootParaXYM(), BootParaYMX(), DeltaStdXMY(), DeltaStdXYM(), DeltaStdYMX(), DeltaXMY(), DeltaXMY(), DeltaXMY(), MCStdXYM(), MCStdXYM(), MCStdXYM(), MCStdXYM(), MCXMY(), MCXYM(), MCXYM(), MCXYM(), MCXYM()
```

BootParaXYM 9

Examples

```
## Not run:
set.seed(42)
library(dynr)
sim <- GenData(taskid = 1)</pre>
data <- RandomMeasurement(sim)</pre>
fit <- FitDynr(data, taskid = 1)</pre>
boot <- BootPara(</pre>
  fit = fit,
  path = getwd(),
  prefix = "pb",
  taskid = 1,
  B = 1000L
)
phi_hat <- PhiHat(fit)</pre>
ci <- BootParaXMY(boot = boot, phi_hat = phi_hat)</pre>
plot(ci)
plot(ci, type = "bc")
## End(Not run)
```

BootParaXYM

Parametric Bootstrap Confidence Intervals for X-Y-M

Description

The function generates parametric bootstrap method confidence intervals for the mediation model $X \to Y \to M$.

Usage

```
BootParaXYM(boot, phi_hat, delta_t = 1:30, ncores = NULL)
```

Arguments

```
boot R object. Output of the BootPara() function.

phi_hat R object. Output of the PhiHat() function.

delta_t Numeric vector. Vector of time intervals.

ncores Positive integer. Number of cores to use.
```

```
Other Confidence Interval Functions: BootPara(), BootParaStdXMY(), BootParaStdXYM(), BootParaStdYMX(), BootParaXMY(), BootParaYMX(), DeltaStdXMY(), DeltaStdXYM(), DeltaStdYMX(), DeltaXMY(), DeltaXMY(), DeltaXMY(), MCStdXYM(), MCStdXYM(), MCStdXYM(), MCStdXYM(), MCXMY(), MCXYM(), MCXYM(), MCXYM(), MCXYM()
```

10 BootParaYMX

Examples

```
## Not run:
set.seed(42)
library(dynr)
sim <- GenData(taskid = 1)</pre>
data <- RandomMeasurement(sim)</pre>
fit <- FitDynr(data, taskid = 1)</pre>
boot <- BootPara(</pre>
  fit = fit,
  path = getwd(),
  prefix = "pb",
  taskid = 1,
  B = 1000L
)
phi_hat <- PhiHat(fit)</pre>
ci <- BootParaXYM(boot = boot, phi_hat = phi_hat)</pre>
plot(ci)
plot(ci, type = "bc")
## End(Not run)
```

BootParaYMX

Parametric Bootstrap Confidence Intervals for Y-M-X

Description

The function generates parametric bootstrap method confidence intervals for the mediation model $Y \to M \to X$.

Usage

```
BootParaYMX(boot, phi_hat, delta_t = 1:30, ncores = NULL)
```

Arguments

```
boot R object. Output of the BootPara() function.

phi_hat R object. Output of the PhiHat() function.

delta_t Numeric vector. Vector of time intervals.

ncores Positive integer. Number of cores to use.
```

```
Other Confidence Interval Functions: BootPara(), BootParaStdXMY(), BootParaStdXYM(), BootParaStdYMX(), BootParaXYM(), BootParaXYM(), DeltaStdXMY(), DeltaStdXYM(), DeltaStdYMX(), DeltaXMY(), DeltaXMY(), DeltaXMY(), MCStdXYM(), MCStdXYM(), MCStdXYM(), MCStdXYM(), MCXMY(), MCXYM(), MCXYM(), MCXYM(), MCXYM()
```

Compress 11

Examples

```
## Not run:
set.seed(42)
library(dynr)
sim <- GenData(taskid = 1)</pre>
data <- RandomMeasurement(sim)</pre>
fit <- FitDynr(data, taskid = 1)</pre>
boot <- BootPara(</pre>
  fit = fit,
  path = getwd(),
  prefix = "pb",
  taskid = 1,
  B = 1000L
)
phi_hat <- PhiHat(fit)</pre>
ci <- BootParaYMX(boot = boot, phi_hat = phi_hat)</pre>
plot(ci, type = "bc")
## End(Not run)
```

Compress

Compress Replication

Description

Compress Replication

Usage

```
Compress(taskid, repid, output_folder)
```

Arguments

taskid Positive integer. Task ID.
repid Positive integer. Replication ID.
output_folder Character string. Output folder.

Value

The output is saved as an external file in output_folder.

Author(s)

Ivan Jacob Agaloos Pesigan

See Also

Other Compression Functions: IllustrationCompress()

12 DeltaStdXYM

DeltaStdXMY

Delta Method Confidence Intervals for X-M-Y (Standardized)

Description

The function generates delta method confidence intervals for the mediation model $X \to M \to Y$ (Standardized).

Usage

```
DeltaStdXMY(theta_hat, delta_t = 1:30)
```

Arguments

```
theta_hat R object. Output of the ThetaHat() function.

delta_t Numeric vector. Vector of time intervals.
```

See Also

```
Other Confidence Interval Functions: BootPara(), BootParaStdXMY(), BootParaStdXYM(), BootParaStdYMX(), BootParaXYM(), BootParaXYM(), BootParaXYM(), DeltaStdXYM(), DeltaStdXYM(), DeltaXMY(), DeltaXMY(), DeltaXMY(), MCStdXYM(), MCStdXYM(), MCStdXYM(), MCStdXYM(), MCXYM(), MCXYM(), MCXYM(), MCXYM(), MCXYM()
```

Examples

```
## Not run:
set.seed(42)
library(dynr)
sim <- GenData(taskid = 1)
data <- RandomMeasurement(sim)
fit <- FitDynr(data, taskid = 1)
theta_hat <- ThetaHat(fit)
ci <- DeltaStdXMY(theta_hat)
plot(ci)
## End(Not run)</pre>
```

DeltaStdXYM

Delta Method Confidence Intervals for X-Y-M (Standardized)

Description

The function generates delta method confidence intervals for the mediation model $X \to Y \to M$ (Standardized).

DeltaStdYMX 13

Usage

```
DeltaStdXYM(theta_hat, delta_t = 1:30)
```

Arguments

theta_hat R object. Output of the ThetaHat() function.

delta_t Numeric vector. Vector of time intervals.

See Also

```
Other Confidence Interval Functions: BootPara(), BootParaStdXMY(), BootParaStdXYM(), BootParaStdYMX(), BootParaXYM(), BootParaXYM(), BootParaYMX(), DeltaStdXMY(), DeltaStdYMX(), DeltaXMY(), DeltaXMY(), DeltaXMY(), MCStdXYM(), MCStdXYM(), MCStdXYM(), MCStdXYM(), MCXMY(), MCXYM(), MCXYM(), MCXYM(), MCXYM()
```

Examples

```
## Not run:
set.seed(42)
library(dynr)
sim <- GenData(taskid = 1)
data <- RandomMeasurement(sim)
fit <- FitDynr(data, taskid = 1)
theta_hat <- ThetaHat(fit)
ci <- DeltaStdXYM(theta_hat)
plot(ci)
## End(Not run)</pre>
```

DeltaStdYMX

Delta Method Confidence Intervals for Y-M-X (Standardized)

Description

The function generates delta method confidence intervals for the mediation model $Y \to M \to X$ (Standardized).

Usage

```
DeltaStdYMX(theta_hat, delta_t = 1:30)
```

Arguments

```
theta_hat R object. Output of the ThetaHat() function.

delta_t Numeric vector. Vector of time intervals.
```

14 DeltaXMY

See Also

```
Other Confidence Interval Functions: BootPara(), BootParaStdXMY(), BootParaStdXYM(), BootParaStdYMX(), BootParaXYM(), BootParaXYM(), BootParaXYM(), DeltaStdXMY(), DeltaStdXYM(), DeltaXMY(), DeltaXMY(), DeltaXMY(), MCStdXYM(), MCStdXYM(), MCStdXYM(), MCStdXYM(), MCXYM(), MCXYM(), MCXYM(), MCXYM(), MCXYM()
```

Examples

```
## Not run:
set.seed(42)
library(dynr)
sim <- GenData(taskid = 1)
data <- RandomMeasurement(sim)
fit <- FitDynr(data, taskid = 1)
theta_hat <- ThetaHat(fit)
ci <- DeltaStdYMX(theta_hat)
plot(ci)
## End(Not run)</pre>
```

DeltaXMY

Delta Method Confidence Intervals for X-M-Y

Description

The function generates delta method confidence intervals for the mediation model $X \to M \to Y$.

Usage

```
DeltaXMY(phi_hat, delta_t = 1:30)
```

Arguments

```
phi_hat R object. Output of the PhiHat() function.

delta_t Numeric vector. Vector of time intervals.
```

```
Other Confidence Interval Functions: BootPara(), BootParaStdXMY(), BootParaStdXYM(), BootParaStdYMX(), BootParaXYM(), BootParaXYM(), BootParaXYM(), DeltaStdXMY(), DeltaStdXYM(), DeltaStdYMX(), DeltaXYM(), DeltaYMX(), IllustrationBootPara(), MCStdXMY(), MCStdXYM(), MCStdYMX(), MCXMY(), MCXYM(), MCXYM(), MCXYM(), MCXYM()
```

DeltaXYM 15

Examples

```
## Not run:
set.seed(42)
library(dynr)
sim <- GenData(taskid = 1)
data <- RandomMeasurement(sim)
fit <- FitDynr(data, taskid = 1)
phi_hat <- PhiHat(fit)
ci <- DeltaXMY(phi_hat)
plot(ci)
## End(Not run)</pre>
```

DeltaXYM

Delta Method Confidence Intervals for X-Y-M

Description

The function generates delta method confidence intervals for the mediation model $X \to Y \to M$.

Usage

```
DeltaXYM(phi_hat, delta_t = 1:30)
```

Arguments

```
phi_hat R object. Output of the PhiHat() function.
delta_t Numeric vector. Vector of time intervals.
```

See Also

```
Other Confidence Interval Functions: BootPara(), BootParaStdXMY(), BootParaStdXYM(), BootParaStdYMX(), BootParaXYM(), BootParaXYM(), BootParaXYM(), DeltaStdXMY(), DeltaStdXYM(), DeltaStdYMX(), DeltaXMY(), DeltaYMX(), IllustrationBootPara(), MCStdXMY(), MCStdXYM(), MCStdYMX(), MCXMY(), MCXYM(), MCXYM(), MCXYM(), MCXYM()
```

Examples

```
## Not run:
set.seed(42)
library(dynr)
sim <- GenData(taskid = 1)
data <- RandomMeasurement(sim)
fit <- FitDynr(data, taskid = 1)
phi_hat <- PhiHat(fit)
ci <- DeltaXYM(phi_hat)
plot(ci)
## End(Not run)</pre>
```

FigPlotEffects

DeltaYMX

Delta Method Confidence Intervals for Y-M-X

Description

The function generates delta method confidence intervals for the mediation model $Y \to M \to X$.

Usage

```
DeltaYMX(phi_hat, delta_t = 1:30)
```

Arguments

```
phi_hat R object. Output of the PhiHat() function.

delta_t Numeric vector. Vector of time intervals.
```

See Also

```
Other Confidence Interval Functions: BootPara(), BootParaStdXMY(), BootParaStdXYM(), BootParaStdYMX(), BootParaXYM(), BootParaXYM(), BootParaXYM(), DeltaStdXMY(), DeltaStdXYM(), DeltaStdYMX(), DeltaXMY(), DeltaXYM(), IllustrationBootPara(), MCStdXMY(), MCStdXYM(), MCStdYMX(), MCXMY(), MCXYM(), MCXYM(), MCXYM()
```

Examples

```
## Not run:
set.seed(42)
library(dynr)
sim <- GenData(taskid = 1)
data <- RandomMeasurement(sim)
fit <- FitDynr(data, taskid = 1)
phi_hat <- PhiHat(fit)
ci <- DeltaYMX(phi_hat)
plot(ci)
## End(Not run)</pre>
```

FigPlotEffects

Plot Total, Direct, and Indirect Effects

Description

```
Effects for the model X \to M \to Y.
```

Usage

```
FigPlotEffects(dynamics = 0, std = FALSE, max_delta_t = 30, xmy = TRUE)
```

Arguments

dynamics	Integer dynamics =	0 for original drift matrix.	dynamics = -1 for near-neutral

dynamics, and dynamics = 1 for stronger damping.

std Logical. If std = TRUE, standardized total, direct, and indirect effects. If std =

FALSE, unstandardized total, direct, and indirect effects.

max_delta_t Numeric. Maximum time interval.

xmy Logical. If xmy = TRUE, plot the effects for the $x \rightarrow m \rightarrow y$ mediation model. If xmy

= FALSE, plot the effects for the $y \rightarrow m \rightarrow x$ mediation model.

Author(s)

Ivan Jacob Agaloos Pesigan

See Also

Other Figure Functions: FigScatterPlotCoverage(), FigScatterPlotPower(), FigScatterPlotSeBias(), FigScatterPlotType1(), IllustrationFigPlotEffects(), IllustrationFigScatterPlotCoverage(), IllustrationFigScatterPlotPower(), IllustrationFigScatterPlotSeBias()

Examples

FigPlotEffects()

FigScatterPlotCoverage

Plot Coverage Probabilities

Description

Coverage probabilities for the model $X \to M \to Y$.

Usage

FigScatterPlotCoverage(results, delta_t = NULL, dynamics = 0, std = FALSE)

Arguments

results	Summary results data frame.
delta_t	Vector of time-interval value. If delta_t = NULL, use all available time-intervals
dynamics	Integer. dynamics = 0 for original drift matrix, dynamics = -1 for near-neutral dynamics, and dynamics = 1 for stronger damping.
std	Logical. If std = TRUE, standardized total, direct, and indirect effects. If std = FALSE, unstandardized total, direct, and indirect effects.

18 FigScatterPlotPower

Author(s)

Ivan Jacob Agaloos Pesigan

See Also

Other Figure Functions: FigPlotEffects(), FigScatterPlotPower(), FigScatterPlotSeBias(), FigScatterPlotType1(), IllustrationFigPlotEffects(), IllustrationFigScatterPlotCoverage(), IllustrationFigScatterPlotPower(), IllustrationFigScatterPlotSeBias()

Examples

```
data(results, package = "manCTMed")
FigScatterPlotCoverage(results)
FigScatterPlotCoverage(results, delta_t = 1:14)
FigScatterPlotCoverage(results, delta_t = 15:30)
```

FigScatterPlotPower

Plot Statistical Power

Description

Statistical power for the model $X \to M \to Y$.

Usage

```
FigScatterPlotPower(results, delta_t = NULL, dynamics = 0, std = FALSE)
```

Arguments

results	Summary results data frame.
delta_t	Vector of time-interval value. If delta_t = NULL, use all available time-intervals
dynamics	Integer. dynamics = 0 for original drift matrix, dynamics = -1 for near-neutral dynamics, and dynamics = 1 for stronger damping.
std	Logical. If std = TRUE, standardized total, direct, and indirect effects. If std = FALSE, unstandardized total, direct, and indirect effects.

Author(s)

Ivan Jacob Agaloos Pesigan

```
Other Figure Functions: FigPlotEffects(), FigScatterPlotCoverage(), FigScatterPlotSeBias(),
FigScatterPlotType1(), IllustrationFigPlotEffects(), IllustrationFigScatterPlotCoverage(),
IllustrationFigScatterPlotPower(), IllustrationFigScatterPlotSeBias()
```

FigScatterPlotSeBias 19

Examples

```
data(results, package = "manCTMed")
FigScatterPlotPower(results)
FigScatterPlotPower(results, delta_t = 1:14)
FigScatterPlotPower(results, delta_t = 15:30)
```

FigScatterPlotSeBias Plot Standard Error Bias

Description

Standard Error Bias for the model $X \to M \to Y$.

Usage

```
FigScatterPlotSeBias(results, delta_t = NULL, dynamics = 0, std = FALSE)
```

Arguments

results	Summary results data frame.
delta_t	Vector of time-interval value. If delta_t = NULL, use all available time-intervals
dynamics	Integer. dynamics = 0 for original drift matrix, dynamics = -1 for near-neutral dynamics, and dynamics = 1 for stronger damping.
std	Logical. If std = TRUE, standardized total, direct, and indirect effects. If std = FALSE, unstandardized total, direct, and indirect effects.

Author(s)

Ivan Jacob Agaloos Pesigan

See Also

```
Other Figure Functions: FigPlotEffects(), FigScatterPlotCoverage(), FigScatterPlotPower(), FigScatterPlotType1(), IllustrationFigPlotEffects(), IllustrationFigScatterPlotCoverage(), IllustrationFigScatterPlotPower(), IllustrationFigScatterPlotSeBias()
```

Examples

```
data(results, package = "manCTMed")
FigScatterPlotSeBias(results)
```

FigScatterPlotType1

FigScatterPlotType1 Plot Type I Error

Description

Type I error for the model $Y \to M \to X$.

Usage

```
FigScatterPlotType1(results, delta_t = NULL, dynamics = 0, std = FALSE)
```

Arguments

results	Summary results data frame.
delta_t	Vector of time-interval value. If delta_t = NULL, use all available time-intervals
dynamics	Integer. dynamics = 0 for original drift matrix, dynamics = -1 for near-neutral dynamics, and dynamics = 1 for stronger damping.
std	Logical. If std = TRUE, standardized total, direct, and indirect effects. If std = FALSE, unstandardized total, direct, and indirect effects.

Author(s)

Ivan Jacob Agaloos Pesigan

See Also

```
Other Figure Functions: FigPlotEffects(), FigScatterPlotCoverage(), FigScatterPlotPower(), FigScatterPlotSeBias(), IllustrationFigPlotEffects(), IllustrationFigScatterPlotCoverage(), IllustrationFigScatterPlotPower(), IllustrationFigScatterPlotSeBias()
```

Examples

```
data(results, package = "manCTMed")
FigScatterPlotType1(results)
FigScatterPlotType1(results, delta_t = 1:14)
FigScatterPlotType1(results, delta_t = 15:30)
```

FitDynr 21

FitDynr

Fit the Model using the dynr Package

Description

The function fits the model using the dynr package.

Usage

```
FitDynr(data, taskid)
```

Arguments

data R object. Output of the RandomMeasurement() function.

taskid Positive integer. Task ID.

See Also

Other Model Fitting Functions: FitMx(), IllustrationFitDynr(), IllustrationFitMx(), IllustrationMCPhiSigma() IllustrationPrepData(), PhiHat(), ThetaHat()

Examples

```
## Not run:
set.seed(42)
library(dynr)
sim <- GenData(taskid = 1)
data <- RandomMeasurement(sim)
fit <- FitDynr(data, taskid = 1)
summary(fit)
## End(Not run)</pre>
```

FitMx

Fit the Model using the OpenMx Package

Description

The function fits the model using the OpenMx package.

Usage

```
FitMx(data, taskid)
```

22 GenData

Arguments

data R object. Output of the RandomMeasurement() function.

taskid Positive integer. Task ID.

See Also

```
Other Model Fitting Functions: FitDynr(), IllustrationFitDynr(), IllustrationFitMx(), IllustrationMCPhiSigma(), IllustrationPrepData(), PhiHat(), ThetaHat()
```

Examples

```
## Not run:
set.seed(42)
library(OpenMx)
sim <- GenData(taskid = 1)
data <- RandomMeasurement(sim)
fit <- FitMx(data, taskid = 1)
summary(fit)
## End(Not run)</pre>
```

GenData

Simulate Data

Description

The function simulates data using the simStateSpace::SimSSMOUFixed() function.

Usage

```
GenData(taskid)
```

Arguments

taskid Positive integer. Task ID.

See Also

Other Data Generation Functions: IllustrationGenData(), RandomMeasurement()

Examples

```
## Not run:
set.seed(42)
sim <- GenData(taskid = 1)
plot(sim)
## End(Not run)</pre>
```

IllustrationBootPara 23

IllustrationBootPara Parametric Bootstrap (Illustration)

Description

The function generates simulated datasets based on a fitted model and refits the model to each generated dataset using the dynr package.

Usage

```
IllustrationBootPara(
  fit,
  path,
  prefix,
  taskid,
  B = 1000L,
  ncores = NULL,
  seed = NULL
)
```

Arguments

```
fit R object. Fitted CT-VAR model.

path Path to a directory to store bootstrap samples and estimates.

prefix Character string. Prefix used for the file names for the bootstrap samples and estimates.

taskid Positive integer. Task ID.

B Positive integer. Number of bootstrap samples.

ncores Positive integer. Number of cores to use.

seed Integer. Random seed.
```

See Also

```
Other Confidence Interval Functions: BootPara(), BootParaStdXMY(), BootParaStdXYM(), BootParaStdYMX(), BootParaXYM(), BootParaXYM(), BootParaXYM(), DeltaStdXMY(), DeltaStdXMY(), DeltaStdXMY(), DeltaStdXMY(), MCStdXMY(), MCStdXMY(), MCXMY(), MCXMY(), MCXMY(), MCXMY(), MCXMY(), MCXMY(), MCXMX()
```

Examples

```
## Not run:
library(dynr)
sim <- IllustrationGenData(seed = 42)
data <- IllustrationPrepData(sim)
fit <- IllustrationFitDynr(data)
summary(fit)</pre>
```

24 IllustrationCompress

```
IllustrationBootPara(
  fit = fit,
  path = getwd(),
  prefix = "pb",
  taskid = 1,
  B = 1000L,
  seed = 42
)

## End(Not run)
```

IllustrationCompress Compress Replication (Illustration)

Description

Compress Replication (Illustration)

Usage

```
IllustrationCompress(taskid, repid, output_folder)
```

Arguments

taskid Positive integer. Task ID.

repid Positive integer. Replication ID. output_folder Character string. Output folder.

Value

The output is saved as an external file in output_folder.

Author(s)

Ivan Jacob Agaloos Pesigan

See Also

Other Compression Functions: Compress()

 $Illustration {\tt FigPlotEffects}$

Plot Total, Direct, and Indirect Effects (Illustration)

Description

Effects for the model $X \to M \to Y$.

Usage

```
IllustrationFigPlotEffects(std = FALSE, max_delta_t = 30)
```

Arguments

std Logical. If std = TRUE, standardized total, direct, and indirect effects. If std =

FALSE, unstandardized total, direct, and indirect effects.

max_delta_t Numeric. Maximum time interval.

Author(s)

Ivan Jacob Agaloos Pesigan

See Also

```
Other Figure Functions: FigPlotEffects(), FigScatterPlotCoverage(), FigScatterPlotPower(), FigScatterPlotSeBias(), FigScatterPlotType1(), IllustrationFigScatterPlotCoverage(), IllustrationFigScatterPlotPower(), IllustrationFigScatterPlotSeBias()
```

Examples

```
IllustrationFigPlotEffects(std = FALSE)
IllustrationFigPlotEffects(std = TRUE)
```

IllustrationFigScatterPlotCoverage

Illustration Plot Coverage Probabilities

Description

Coverage probabilities for the model $X \to M \to Y$.

Usage

IllustrationFigScatterPlotCoverage(illustration_results)

Arguments

```
illustration_results
```

Summary results data frame.

Author(s)

Ivan Jacob Agaloos Pesigan

See Also

```
Other Figure Functions: FigPlotEffects(), FigScatterPlotCoverage(), FigScatterPlotPower(), FigScatterPlotSeBias(), FigScatterPlotType1(), IllustrationFigPlotEffects(), IllustrationFigScatterPlotIllustrationFigScatterPlotSeBias()
```

Examples

```
data(illustration_results, package = "manCTMed")
IllustrationFigScatterPlotCoverage(illustration_results)
```

 $Illustration {\tt FigScatterPlotPower}$

Illustration Plot Statistical Power

Description

Statistical Power for the model $X \to M \to Y$.

Usage

IllustrationFigScatterPlotPower(illustration_results)

Arguments

```
illustration_results
```

Summary results data frame.

Author(s)

Ivan Jacob Agaloos Pesigan

```
Other Figure Functions: FigPlotEffects(), FigScatterPlotCoverage(), FigScatterPlotPower(), FigScatterPlotSeBias(), FigScatterPlotType1(), IllustrationFigPlotEffects(), IllustrationFigScatterPlotIllustrationFigScatterPlotSeBias()
```

Examples

```
data(illustration_results, package = "manCTMed")
IllustrationFigScatterPlotPower(illustration_results)
```

IllustrationFigScatterPlotSeBias

Illustration Plot Standard Error Bias

Description

Standard Error Bias for the model $X \to M \to Y$.

Usage

IllustrationFigScatterPlotSeBias(illustration_results)

Arguments

illustration_results

Summary results data frame.

Author(s)

Ivan Jacob Agaloos Pesigan

See Also

```
Other Figure Functions: FigPlotEffects(), FigScatterPlotCoverage(), FigScatterPlotPower(), FigScatterPlotSeBias(), FigScatterPlotType1(), IllustrationFigPlotEffects(), IllustrationFigScatterPlotIllustrationFigScatterPlotPower()
```

Examples

```
data(illustration_results, package = "manCTMed")
IllustrationFigScatterPlotSeBias(illustration_results)
```

28 IllustrationFitMx

IllustrationFitDynr Fit the Model using the dynr Package (Illustration)

Description

The function fits the model using the dynr package.

Usage

```
IllustrationFitDynr(data)
```

Arguments

data

R object. Output of the IllustrationPrepData() function.

See Also

```
Other Model Fitting Functions: FitDynr(), FitMx(), IllustrationFitMx(), IllustrationMCPhiSigma(), IllustrationPrepData(), PhiHat(), ThetaHat()
```

Examples

```
## Not run:
library(dynr)
sim <- IllustrationGenData(seed = 42)
data <- IllustrationPrepData(sim)
fit <- IllustrationFitDynr(data)
summary(fit)
## End(Not run)</pre>
```

Illustration Fit Mx

Fit the Model using the OpenMx Package (Illustration)

Description

The function fits the model using the OpenMx package.

Usage

```
IllustrationFitMx(data)
```

Arguments

data

R object. Output of the IllustrationPrepData() function.

IllustrationGenData 29

See Also

```
Other Model Fitting Functions: FitDynr(), FitMx(), IllustrationFitDynr(), IllustrationMCPhiSigma(), IllustrationPrepData(), PhiHat(), ThetaHat()
```

Examples

```
## Not run:
library(OpenMx)
sim <- IllustrationGenData(seed = 42)
data <- IllustrationPrepData(sim)
fit <- IllustrationFitMx(data)
summary(fit)
## End(Not run)</pre>
```

IllustrationGenData Simulate Data (Illustration)

Description

The function simulates data using the simStateSpace::SimSSMOUFixed() function.

Usage

```
IllustrationGenData(seed = NULL, n = 133, m = 101, delta_t_gen = 0.1)
```

Arguments

```
seed Integer. Random seed.

n Positive integer. Sample size.

m Positive integer. Measurement occasions.

delta_t_gen Numeric. Time interval used to generate data.
```

See Also

Other Data Generation Functions: GenData(), RandomMeasurement()

Examples

```
## Not run:
sim <- IllustrationGenData(seed = 42)
plot(sim)
## End(Not run)</pre>
```

30 IllustrationPrepData

```
IllustrationMCPhiSigma
```

Generate a Sampling Distribution of Drift Matrices and Process Noise Covariance Matrices (Illustration)

Description

The function generates a sampling distribution of drift matrices and process noise covariance matrices using te Monte Carlo method.

Usage

```
IllustrationMCPhiSigma(fit, R = 20000L, seed = NULL)
```

Arguments

fit R object. Fitted CT-VAR model.

R Positive integer. Number of Monte Carlo replications.

seed Integer. Random seed.

See Also

```
Other Model Fitting Functions: FitDynr(), FitMx(), IllustrationFitDynr(), IllustrationFitMx(), IllustrationPrepData(), PhiHat(), ThetaHat()
```

Examples

```
## Not run:
library(dynr)
sim <- IllustrationGenData(seed = 42)
data <- IllustrationPrepData(sim)
fit <- IllustrationFitDynr(data)
IllustrationMCPhiSigma(fit, seed = 42)
## End(Not run)</pre>
```

IllustrationPrepData Prepare Data Before Model Fitting (Illustration)

Description

The function converts the output of IllustrationGenData() into a data frame.

Usage

```
IllustrationPrepData(sim)
```

illustration_dist 31

Arguments

sim

R object. Output of the IllustrationGenData() function.

See Also

```
Other Model Fitting Functions: FitDynr(), FitMx(), IllustrationFitDynr(), IllustrationFitMx(), IllustrationMCPhiSigma(), PhiHat(), ThetaHat()
```

Examples

```
## Not run:
sim <- IllustrationGenData(seed = 42)
data <- IllustrationPrepData(sim)
head(data)
dim(data)
## End(Not run)</pre>
```

illustration_dist

Illustration Sampling Distribution

Description

Illustration Sampling Distribution

Usage

```
data(illustration_dist)
```

Format

A matrix with 1000 rows and 27 columns:

phi_xx Elements of the drift matrix.

sigma_xx Elements of the process noise covariance matrix.

theta_xx Elements of the measurement error covariance matrix.

mu0_x Elements of the initial condition mean vector.

sigma0_xx Elements of the initial condition covariance matrix.

Author(s)

Description

Illustration Sampling Distribution Discrete Time - Time Interval of 1

Usage

```
data(illustration_dist_dt)
```

Format

A matrix with 1000 rows and 15 columns:

beta_xx Elements of the matrix of lagged coefficients.

psi_xx Elements of the process noise covariance matrix.

Author(s)

Ivan Jacob Agaloos Pesigan

```
illustration_dist_dt_mc
```

Illustration Sampling Distribution Discrete Time - Time Interval of 1 (Monte Carlo Method)

Description

Illustration Sampling Distribution Discrete Time - Time Interval of 1 (Monte Carlo Method)

Usage

```
data(illustration_dist_dt_mc)
```

Format

A matrix with 20000 rows and 15 columns:

beta_xx Elements of the matrix of lagged coefficients.

psi_xx Elements of the process noise covariance matrix.

Author(s)

illustration_dist_mc 33

Description

Illustration Sampling Distribution (Monte Carlo Method)

Usage

```
data(illustration_dist_mc)
```

Format

A matrix with 20000 rows and 15 columns:

phi_xx Elements of the drift matrix.

sigma_xx Elements of the process noise covariance matrix.

Author(s)

Ivan Jacob Agaloos Pesigan

Description

Illustration Sampling Distribution Total, Direct, and Indirect Effects - Time Interval of 1

Usage

```
data(illustration_dist_med)
```

Format

A matrix with 1000 rows and 27 columns:

total Total effect.

direct Direct effect.

indirect Indirect effect.

Author(s)

```
illustration_dist_med_mc
```

Illustration Sampling Distribution Total, Direct, and Indirect Effects -Time Interval of 1 (Monte Carlo Method)

Description

Illustration Sampling Distribution Total, Direct, and Indirect Effects - Time Interval of 1 (Monte Carlo Method)

Usage

```
data(illustration_dist_med_mc)
```

Format

A matrix with 20000 rows and 27 columns:

total Total effect.

direct Direct effect.

indirect Indirect effect.

Author(s)

Ivan Jacob Agaloos Pesigan

```
illustration\_dist\_med\_std
```

Illustration Sampling Distribution Standardized Total, Direct, and Indirect Effects - Time Interval of $\it 1$

Description

Illustration Sampling Distribution Standardized Total, Direct, and Indirect Effects - Time Interval of $\mathbf{1}$

Usage

```
data(illustration_dist_med_std)
```

Format

A matrix with 1000 rows and 27 columns:

total Total effect.

direct Direct effect.

indirect Indirect effect.

Author(s)

Ivan Jacob Agaloos Pesigan

illustration_dist_med_std_mc

Illustration Sampling Distribution Standardized Total, Direct, and Indirect Effects - Time Interval of 1 (Monte Carlo Method)

Description

Illustration Sampling Distribution Standardized Total, Direct, and Indirect Effects - Time Interval of 1 (Monte Carlo Method)

Usage

```
data(illustration_dist_med_std_mc)
```

Format

A matrix with 20000 rows and 27 columns:

total Total effect.

direct Direct effect.

indirect Indirect effect.

Author(s)

Ivan Jacob Agaloos Pesigan

 $illustration_results \quad \textit{Illustration Small Scale Simulation Results}$

Description

Illustration Small Scale Simulation Results

Usage

```
data(illustration_results)
```

36 illustration_results

Format

```
A with 22 columns:
```

taskid Task ID.

replications Number of replications.

effect Total, direct, or indirect effect.

interval Time interval.

parameter Population parameter.

method Method used to generate confidence intervals.

xmy Logical. TRUE for x to m to y path.

std Logical. TRUE for standardized. FALSE for unstandardized.

est Mean parameter estimate.

se Mean standard error.

z Mean z statistic.

p Mean p-value.

R Number of Monte Carlo or bootstrap replications.

Il Mean lower limit of the 95% confidence interval.

ul Mean upper limit of the 95% confidence interval.

sig Proportion of statistically significant results.

zero_hit Proportion of replications where the confidence intervals included zero.

theta_hit Proportion of replications where the confidence intervals included the population parameter.

sq_error Mean squared error.

se_bias Bias in standard error estimate.

coverage Coverage probability.

power Statistical power.

Author(s)

MCStdXMY 37

MCStdXMY

Monte Carlo Method Confidence Intervals for X-M-Y (Standardized)

Description

The function generates Monte Carlo method confidence intervals for the mediation model $X \to M \to Y$ (Standardized).

Usage

```
MCStdXMY(theta_hat, delta_t = 1:30, R = 20000L, seed = NULL)
```

Arguments

theta_hat R object. Output of the ThetaHat() function.

delta_t Numeric vector. Vector of time intervals.

R Positive integer. Number of Monte Carlo replications.

seed Integer. Random seed.

See Also

```
Other Confidence Interval Functions: BootPara(), BootParaStdXMY(), BootParaStdXYM(), BootParaStdYMX(), BootParaXYM(), BootParaXYM(), BootParaXYM(), DeltaStdXMY(), DeltaStdXYM(), DeltaStdYMX(), DeltaXMY(), DeltaXYM(), DeltaXYM(), IllustrationBootPara(), MCStdXYM(), MCStdYMX(), MCXMY(), MCXYM(), MCXYM(), MCXYM()
```

```
## Not run:
set.seed(42)
library(dynr)
sim <- GenData(taskid = 1)
data <- RandomMeasurement(sim)
fit <- FitDynr(data, taskid = 1)
theta_hat <- ThetaHat(fit)
ci <- MCStdXMY(theta_hat, seed = 42)
plot(ci)
## End(Not run)</pre>
```

38 MCStdXYM

MCStdXYM

Monte Carlo Method Confidence Intervals for X-Y-M (Standardized)

Description

The function generates Monte Carlo method confidence intervals for the mediation model $X \to Y \to M$ (Standardized).

Usage

```
MCStdXYM(theta_hat, delta_t = 1:30, R = 20000L, seed = NULL)
```

Arguments

theta_hat R object. Output of the ThetaHat() function.

delta_t Numeric vector. Vector of time intervals.

R Positive integer. Number of Monte Carlo replications.

seed Integer. Random seed.

See Also

```
Other Confidence Interval Functions: BootPara(), BootParaStdXMY(), BootParaStdXYM(), BootParaStdYMX(), BootParaXYM(), BootParaXYM(), BootParaXYM(), DeltaStdXMY(), DeltaStdXMY(), DeltaStdXMY(), DeltaStdYMX(), DeltaXMY(), DeltaXYM(), DeltaXYM(), IllustrationBootPara(), MCStdXMY(), MCStdYMX(), MCXMY(), MCXYM(), MCXYM(), MCXYM()
```

```
## Not run:
set.seed(42)
library(dynr)
sim <- GenData(taskid = 1)
data <- RandomMeasurement(sim)
fit <- FitDynr(data, taskid = 1)
theta_hat <- ThetaHat(fit)
ci <- MCStdXYM(theta_hat, seed = 42)
plot(ci)
## End(Not run)</pre>
```

MCStdYMX 39

MCStdYMX

Monte Carlo Method Confidence Intervals for Y-M-X (Standardized)

Description

The function generates Monte Carlo method confidence intervals for the mediation model $Y \to M \to X$ (Standardized).

Usage

```
MCStdYMX(theta_hat, delta_t = 1:30, R = 20000L, seed = NULL)
```

Arguments

theta_hat R object. Output of the ThetaHat() function.

delta_t Numeric vector. Vector of time intervals.

R Positive integer. Number of Monte Carlo replications.

seed Integer. Random seed.

See Also

```
Other Confidence Interval Functions: BootPara(), BootParaStdXMY(), BootParaStdXYM(), BootParaStdYMX(), BootParaXYM(), BootParaXYM(), BootParaXYM(), DeltaStdXMY(), DeltaStdXYM(), DeltaStdYMX(), DeltaXMY(), DeltaXYM(), DeltaXYM(), IllustrationBootPara(), MCStdXMY(), MCStdXYM(), MCXMY(), MCXYM(), MCXYM(), MCXYM()
```

```
## Not run:
set.seed(42)
library(dynr)
sim <- GenData(taskid = 1)
data <- RandomMeasurement(sim)
fit <- FitDynr(data, taskid = 1)
theta_hat <- ThetaHat(fit)
ci <- MCStdYMX(phi_hat, seed = 42)
plot(ci)
## End(Not run)</pre>
```

40 MCXMY

MCXMY

Monte Carlo Method Confidence Intervals for X-M-Y

Description

The function generates Monte Carlo method confidence intervals for the mediation model $X \to M \to Y$.

Usage

```
MCXMY(phi_hat, delta_t = 1:30, R = 20000L, seed = NULL)
```

Arguments

phi_hat R object. Output of the PhiHat() function.

delta_t Numeric vector. Vector of time intervals.

R Positive integer. Number of Monte Carlo replications.

seed Integer. Random seed.

See Also

```
Other Confidence Interval Functions: BootPara(), BootParaStdXMY(), BootParaStdXYM(), BootParaStdYMX(), BootParaXYM(), BootParaXYM(), BootParaXYM(), DeltaStdXMY(), DeltaStdXMY(), DeltaStdXMY(), DeltaStdXMY(), DeltaXYM(), DeltaXYM(), MCStdXMY(), MCStdXMY(), MCStdXMY(), MCStdXMY(), MCStdXMY(), MCXYM(), MCYMX()
```

```
## Not run:
set.seed(42)
library(dynr)
sim <- GenData(taskid = 1)
data <- RandomMeasurement(sim)
fit <- FitDynr(data, taskid = 1)
phi_hat <- PhiHat(fit)
ci <- MCXMY(phi_hat, seed = 42)
plot(ci)
## End(Not run)</pre>
```

MCXYM 41

MCXYM

Monte Carlo Method Confidence Intervals for X-Y-M

Description

The function generates Monte Carlo method confidence intervals for the mediation model $X \to Y \to M$.

Usage

```
MCXYM(phi_hat, delta_t = 1:30, R = 20000L, seed = NULL)
```

Arguments

phi_hat R object. Output of the PhiHat() function.

delta_t Numeric vector. Vector of time intervals.

R Positive integer. Number of Monte Carlo replications.

seed Integer. Random seed.

See Also

```
Other Confidence Interval Functions: BootPara(), BootParaStdXMY(), BootParaStdXYM(), BootParaStdYMX(), BootParaXYM(), BootParaXYM(), BootParaXYM(), DeltaStdXMY(), DeltaStdXYM(), DeltaStdYMX(), DeltaXMY(), DeltaXYM(), DeltaXYM(), IllustrationBootPara(), MCStdXMY(), MCStdXYM(), MCStdXYM(), MCStdXMY(), MCXMY(), MCYMX()
```

```
## Not run:
set.seed(42)
library(dynr)
sim <- GenData(taskid = 1)
data <- RandomMeasurement(sim)
fit <- FitDynr(data, taskid = 1)
phi_hat <- PhiHat(fit)
ci <- MCXYM(phi_hat, seed = 42)
plot(ci)
## End(Not run)</pre>
```

42 MCYMX

MCYMX

Monte Carlo Method Confidence Intervals for Y-M-X

Description

The function generates Monte Carlo method confidence intervals for the mediation model $Y \to M \to X$.

Usage

```
MCYMX(phi_hat, delta_t = 1:30, R = 20000L, seed = NULL)
```

Arguments

phi_hat R object. Output of the PhiHat() function.

delta_t Numeric vector. Vector of time intervals.

R Positive integer. Number of Monte Carlo replications.

seed Integer. Random seed.

See Also

```
Other Confidence Interval Functions: BootPara(), BootParaStdXMY(), BootParaStdXYM(), BootParaStdYMX(), BootParaXYM(), BootParaXYM(), BootParaXYM(), DeltaStdXMY(), DeltaStdXMY(), DeltaStdXMY(), DeltaStdXMY(), DeltaXYM(), DeltaXYM(), MCStdXMY(), MCStdXMY(), MCStdXMY(), MCStdXMY(), MCXMY(), MCXYM()
```

```
## Not run:
set.seed(42)
library(dynr)
sim <- GenData(taskid = 1)
data <- RandomMeasurement(sim)
fit <- FitDynr(data, taskid = 1)
phi_hat <- PhiHat(fit)
ci <- MCYMX(phi_hat, seed = 42)
plot(ci)
## End(Not run)</pre>
```

params 43

params

Simulation Parameters

Description

Simulation Parameters

Usage

data(params)

Format

A dataframe with 30 rows and 3 columns:

taskid Simulation Task ID.

n Sample size.

dynamics Dynamics. 0 for original drift matrix, -1 for near-neutral dynamics, and 1 for stronger damping.

Author(s)

Ivan Jacob Agaloos Pesigan

PhiHat

Estimated Drift Matrix

Description

The function extracts the estimated drift matrix from the fitted model.

Usage

PhiHat(fit)

Arguments

fit

R object. Output of the FitDynr(), FitMx(), IllustrationFitDynr(), or IllustrationFitMx(), functions.

See Also

```
Other Model Fitting Functions: FitDynr(), FitMx(), IllustrationFitDynr(), IllustrationFitMx(), IllustrationMCPhiSigma(), IllustrationPrepData(), ThetaHat()
```

44 RandomMeasurement

Examples

```
## Not run:
set.seed(42)
library(dynr)
sim <- GenData(n = 50)
data <- RandomMeasurement(sim)
fit <- FitDynr(data)
PhiHat(fit)
## End(Not run)</pre>
```

RandomMeasurement

Simulate Random Measurement

Description

The function randomly selects 100 observations from the generated data and replaces the unselected observations with NA.

Usage

RandomMeasurement(sim)

Arguments

sim

R object. Output of the GenData() function.

See Also

Other Data Generation Functions: GenData(), IllustrationGenData()

```
## Not run:
set.seed(42)
sim <- GenData(taskid = 1)
RandomMeasurement(sim)
## End(Not run)</pre>
```

results 45

results

Simulation Results

Description

Simulation Results

Usage

data(results)

Format

A dataframe with 24 columns:

taskid Task ID.

replications Number of replications.

effect Total, direct, or indirect effect.

interval Time interval.

dynamics Dynamics. 0 for original drift matrix, -1 for near-neutral dynamics, and 1 for stronger damping.

parameter Population parameter.

method Method used to generate confidence intervals.

xmy If TRUE, the mediation model is $X \to M \to Y$. If FALSE, the mediation model is $Y \to M \to X$.

std If TRUE, standardized total, direct, and indirect effects. If FALSE, unstandardized total, direct, and indirect effects.

n Sample size.

est Mean parameter estimate.

- se Mean standard error.
- **z** Mean z statistic.
- **p** Mean *p*-value.
- R Number of Monte Carlo replications.
- **ll** Mean lower limit of the 95% confidence interval.
- ul Mean upper limit of the 95% confidence interval.
- sig Proportion of statistically significant results.

zero_hit Proportion of replications where the confidence intervals contained zero.

theta_hit Proportion of replications where the confidence intervals contained the population parameter.

sq_error Mean squared error.

se_bias Bias in standard error estimate.

coverage Coverage probability.

power Statistical power.

46 Sim

Author(s)

Ivan Jacob Agaloos Pesigan

Sim Simulation Replication

Description

Simulation Replication

Usage

```
Sim(
  taskid,
  repid,
  output_folder,
  overwrite,
  integrity,
  seed,
  ci,
  pb,
  delta_t,
  R,
  B
)
```

Arguments

Positive integer. Task ID. taskid repid Positive integer. Replication ID. Character string. Output folder. output_folder overwrite Logical. Overwrite existing output in output_folder. Logical. If integrity = TRUE, check for the output file integrity when overwrite integrity = FALSE. Integer. Random seed. seed Logical. Run simulations for confidence intervals. ci pb Logical. Run simulations for parametric bootstrap confidence intervals. delta_t Numeric vector. Vector of time intervals. R Positive integer. Number of Monte Carlo replications. В Positive integer. Number of bootstrap samples.

Value

The output is saved as an external file in output_folder.

SimDynrBootPara 47

Author(s)

Ivan Jacob Agaloos Pesigan

SimDynrBootPara Simulation Replication - BootPara

Description

Simulation Replication - BootPara

Usage

```
SimDynrBootPara(
   taskid,
   repid,
   output_folder,
   seed,
   suffix,
   overwrite,
   integrity,
   B,
   ncores = NULL
)
```

Arguments

Positive integer. Task ID. taskid repid Positive integer. Replication ID. output_folder Character string. Output folder. seed Integer. Random seed. suffix Character string. Output of manCTMed:::.SimSuffix(). Logical. Overwrite existing output in output_folder. overwrite Logical. If integrity = TRUE, check for the output file integrity when overwrite integrity = FALSE. В Positive integer. Number of bootstrap samples. Positive integer. Number of cores to use. ncores

Details

This function is executed via the Sim function.

Value

The output is saved as an external file in output_folder.

Author(s)

Ivan Jacob Agaloos Pesigan

SimDynrBootParaStdXMY Simulation Replication - BootParaStdXMY

Description

Simulation Replication - BootParaStdXMY

Usage

```
SimDynrBootParaStdXMY(
  taskid,
  repid,
  output_folder,
  seed,
  suffix,
  overwrite,
  integrity,
  delta_t
)
```

Arguments

taskid Positive integer. Task ID.
repid Positive integer. Replication ID.
output_folder Character string. Output folder.
seed Integer. Random seed.

suffix Character string. Output of manCTMed:::.SimSuffix().
overwrite Logical. Overwrite existing output in output_folder.

integrity Logical. If integrity = TRUE, check for the output file integrity when overwrite

= FALSE.

delta_t Numeric vector. Vector of time intervals.

Details

This function is executed via the Sim function.

Value

The output is saved as an external file in output_folder.

Author(s)

SimDynrBootParaStdYMX Simulation Replication - BootParaStdYMX

Description

Simulation Replication - BootParaStdYMX

Usage

```
SimDynrBootParaStdYMX(
  taskid,
  repid,
  output_folder,
  seed,
  suffix,
  overwrite,
  integrity,
  delta_t
)
```

Arguments

taskid Positive integer. Task ID.

repid Positive integer. Replication ID. output_folder Character string. Output folder.

seed Integer. Random seed.

suffix Character string. Output of manCTMed:::.SimSuffix().

overwrite Logical. Overwrite existing output in output_folder.

integrity Logical. If integrity = TRUE, check for the output file integrity when overwrite

= FALSE.

delta_t Numeric vector. Vector of time intervals.

Details

This function is executed via the Sim function.

Value

The output is saved as an external file in output_folder.

Author(s)

SimDynrBootParaXMY

Simulation Replication - BootParaXMY

Description

Simulation Replication - BootParaXMY

Usage

```
SimDynrBootParaXMY(
  taskid,
  repid,
  output_folder,
  seed,
  suffix,
  overwrite,
  integrity,
  delta_t
)
```

Arguments

taskid Positive integer. Task ID.

repid Positive integer. Replication ID. output_folder Character string. Output folder.

seed Integer. Random seed.

suffix Character string. Output of manCTMed:::.SimSuffix().

overwrite Logical. Overwrite existing output in output_folder.

integrity Logical. If integrity = TRUE, check for the output file integrity when overwrite

= FALSE.

delta_t Numeric vector. Vector of time intervals.

Details

This function is executed via the Sim function.

Value

The output is saved as an external file in output_folder.

Author(s)

SimDynrBootParaYMX Sim

Simulation Replication - BootParaYMX

Description

Simulation Replication - BootParaYMX

Usage

```
SimDynrBootParaYMX(
  taskid,
  repid,
  output_folder,
  seed,
  suffix,
  overwrite,
  integrity,
  delta_t
)
```

Arguments

taskid Positive integer. Task ID.

repid Positive integer. Replication ID. output_folder Character string. Output folder.

seed Integer. Random seed.

suffix Character string. Output of manCTMed:::.SimSuffix().

overwrite Logical. Overwrite existing output in output_folder.

integrity Logical. If integrity = TRUE, check for the output file integrity when overwrite

= FALSE.

delta_t Numeric vector. Vector of time intervals.

Details

This function is executed via the Sim function.

Value

The output is saved as an external file in output_folder.

Author(s)

SimDynrDeltaStdXMY

Simulation Replication - DynrDeltaStdXMY

Description

Simulation Replication - DynrDeltaStdXMY

Usage

```
SimDynrDeltaStdXMY(
  taskid,
  repid,
  output_folder,
  seed,
  suffix,
  overwrite,
  integrity,
  delta_t
)
```

Arguments

taskid Positive integer. Task ID.

repid Positive integer. Replication ID. output_folder Character string. Output folder.

seed Integer. Random seed.

suffix Character string. Output of manCTMed:::.SimSuffix().

overwrite Logical. Overwrite existing output in output_folder.

integrity Logical. If integrity = TRUE, check for the output file integrity when overwrite

= FALSE.

delta_t Numeric vector. Vector of time intervals.

Details

This function is executed via the Sim function.

Value

The output is saved as an external file in output_folder.

Author(s)

SimDynrDeltaStdYMX Simulation Replication - DynrDeltaStdYMX

Description

Simulation Replication - DynrDeltaStdYMX

Usage

```
SimDynrDeltaStdYMX(
  taskid,
  repid,
  output_folder,
  seed,
  suffix,
  overwrite,
  integrity,
  delta_t
)
```

Arguments

taskid Positive integer. Task ID.

repid Positive integer. Replication ID. output_folder Character string. Output folder.

seed Integer. Random seed.

suffix Character string. Output of manCTMed:::.SimSuffix().

overwrite Logical. Overwrite existing output in output_folder.

integrity Logical. If integrity = TRUE, check for the output file integrity when overwrite

= FALSE.

delta_t Numeric vector. Vector of time intervals.

Details

This function is executed via the Sim function.

Value

The output is saved as an external file in output_folder.

Author(s)

54 SimDynrDeltaXMY

SimDynrDeltaXMY

Simulation Replication - DynrDeltaXMY

Description

Simulation Replication - DynrDeltaXMY

Usage

```
SimDynrDeltaXMY(
  taskid,
  repid,
  output_folder,
  seed,
  suffix,
  overwrite,
  integrity,
  delta_t
)
```

Arguments

taskid Positive integer. Task ID.

repid Positive integer. Replication ID. output_folder Character string. Output folder.

seed Integer. Random seed.

suffix Character string. Output of manCTMed:::.SimSuffix().

overwrite Logical. Overwrite existing output in output_folder.

integrity Logical. If integrity = TRUE, check for the output file integrity when overwrite

= FALSE.

delta_t Numeric vector. Vector of time intervals.

Details

This function is executed via the Sim function.

Value

The output is saved as an external file in output_folder.

Author(s)

SimDynrDeltaYMX 55

SimDynrDeltaYMX Simulation Replication - DynrDeltaYMX	SimDynrDeltaYMX	Simulation Replication - DynrDeltaYMX	
---	-----------------	---------------------------------------	--

Description

Simulation Replication - DynrDeltaYMX

Usage

```
SimDynrDeltaYMX(
  taskid,
  repid,
  output_folder,
  seed,
  suffix,
  overwrite,
  integrity,
  delta_t
)
```

Arguments

taskid Positive integer. Task ID. repid Positive integer. Replication ID. output_folder Character string. Output folder. seed Integer. Random seed. suffix Character string. Output of manCTMed:::.SimSuffix(). Logical. Overwrite existing output in output_folder. overwrite integrity Logical. If integrity = TRUE, check for the output file integrity when overwrite = FALSE. Numeric vector. Vector of time intervals. delta_t

Details

This function is executed via the Sim function.

Value

The output is saved as an external file in output_folder.

Author(s)

SimDynrMCStdXMY

Simulation Replication - DynrMCStdXMY

Description

Simulation Replication - DynrMCStdXMY

Usage

```
SimDynrMCStdXMY(
  taskid,
  repid,
  output_folder,
  seed,
  suffix,
 overwrite,
  integrity,
  delta_t,
 R
)
```

Arguments

taskid Positive integer. Task ID. Positive integer. Replication ID. repid output_folder Character string. Output folder. Integer. Random seed. seed Character string. Output of manCTMed:::.SimSuffix(). suffix overwrite Logical. Overwrite existing output in output_folder. Logical. If integrity = TRUE, check for the output file integrity when overwrite integrity = FALSE. Numeric vector. Vector of time intervals.

delta_t

R Positive integer. Number of Monte Carlo replications.

Details

This function is executed via the Sim function.

Value

The output is saved as an external file in output_folder.

Author(s)

SimDynrMCStdYMX 57

SimDynrMCStdYMX Simulation Replication - DynrMCStdYMX

Description

Simulation Replication - DynrMCStdYMX

Usage

```
SimDynrMCStdYMX(
  taskid,
  repid,
  output_folder,
  seed,
  suffix,
  overwrite,
  integrity,
  delta_t,
  R
)
```

Arguments

taskid Positive integer. Task ID. repid Positive integer. Replication ID. output_folder Character string. Output folder. Integer. Random seed. seed Character string. Output of manCTMed:::.SimSuffix(). suffix overwrite Logical. Overwrite existing output in output_folder. Logical. If integrity = TRUE, check for the output file integrity when overwrite integrity = FALSE. Numeric vector. Vector of time intervals. delta_t R Positive integer. Number of Monte Carlo replications.

Details

This function is executed via the Sim function.

Value

The output is saved as an external file in output_folder.

Author(s)

58 SimDynrMCXMY

SimDynrMCXMY

Simulation Replication - DynrMCXMY

Description

Simulation Replication - DynrMCXMY

Usage

```
SimDynrMCXMY(
   taskid,
   repid,
   output_folder,
   seed,
   suffix,
   overwrite,
   integrity,
   delta_t,
   R
)
```

Arguments

taskid Positive integer. Task ID.

repid Positive integer. Replication ID.

output_folder Character string. Output folder.

seed Integer. Random seed.

Suffix Character string. Output of many

suffix Character string. Output of manCTMed:::.SimSuffix().
overwrite Logical. Overwrite existing output in output_folder.

integrity Logical. If integrity = TRUE, check for the output file integrity when overwrite

= FALSE.

delta_t Numeric vector. Vector of time intervals.

R Positive integer. Number of Monte Carlo replications.

Details

This function is executed via the Sim function.

Value

The output is saved as an external file in output_folder.

Author(s)

SimDynrMCYMX 59

SimDynrMCYMX

Simulation Replication - DynrMCYMX

Description

Simulation Replication - DynrMCYMX

Usage

```
SimDynrMCYMX(
  taskid,
  repid,
  output_folder,
  seed,
  suffix,
  overwrite,
  integrity,
  delta_t,
  R
)
```

Arguments

taskid Positive integer. Task ID. Positive integer. Replication ID. repid output_folder Character string. Output folder. Integer. Random seed. seed Character string. Output of manCTMed:::.SimSuffix(). suffix overwrite Logical. Overwrite existing output in output_folder. Logical. If integrity = TRUE, check for the output file integrity when overwrite integrity = FALSE. Numeric vector. Vector of time intervals. delta_t

Positive integer. Number of Monte Carlo replications.

Details

R

This function is executed via the Sim function.

Value

The output is saved as an external file in output_folder.

Author(s)

60 SimFitDynr

Description

Simulation Replication - FitDynr

Usage

```
SimFitDynr(taskid, repid, output_folder, seed, suffix, overwrite, integrity)
```

Arguments

taskid Positive integer. Task ID.

repid Positive integer. Replication ID.
output_folder Character string. Output folder.

seed Integer. Random seed.

suffix Character string. Output of manCTMed:::.SimSuffix().

overwrite Logical. Overwrite existing output in output_folder.

integrity Logical. If integrity = TRUE, check for the output file integrity when overwrite

= FALSE.

Details

This function is executed via the Sim function.

Value

The output is saved as an external file in output_folder.

Author(s)

SimFitMx 61

SimFitMx	Simulation Replication - FitMx

Description

Simulation Replication - FitMx

Usage

```
SimFitMx(taskid, repid, output_folder, seed, suffix, overwrite, integrity)
```

Arguments

taskid Positive integer. Task ID.

repid Positive integer. Replication ID.

output_folder Character string. Output folder.

seed Integer. Random seed.

suffix Character string. Output of manCTMed:::.SimSuffix().

overwrite Logical. Overwrite existing output in output_folder.

integrity Logical. If integrity = TRUE, check for the output file integrity when overwrite

= FALSE.

Details

This function is executed via the Sim function.

Value

The output is saved as an external file in output_folder.

Author(s)

62 SimGenData

SimFN	Simulation File Name	

Description

Simulation File Name

Usage

```
SimFN(output_type, output_folder, suffix)
```

Arguments

output_type Character string. Output type.
output_folder Character string. Output folder.

suffix Character string. Output of manCTMed:::.SimSuffix().

Value

Returns a character string file name with the output_folder in the OS-specific format.

|--|

Description

Simulation Replication - GenData

Usage

```
SimGenData(taskid, repid, output_folder, seed, suffix, overwrite, integrity)
```

Arguments

taskid Positive integer. Task ID.

repid Positive integer. Replication ID. output_folder Character string. Output folder.

seed Integer. Random seed.

suffix Character string. Output of manCTMed:::.SimSuffix().

overwrite Logical. Overwrite existing output in output_folder.

integrity Logical. If integrity = TRUE, check for the output file integrity when overwrite

= FALSE.

SimIllustration 63

Details

This function is executed via the Sim function.

Value

The output is saved as an external file in output_folder.

Author(s)

Ivan Jacob Agaloos Pesigan

SimIllustration

Simulation Replication (Illustration)

Description

Simulation Replication (Illustration)

Usage

```
SimIllustration(
  taskid,
  repid,
  output_folder,
  overwrite,
  integrity,
  seed,
  ci,
  pb,
  delta_t,
  R,
  B
)
```

Arguments

```
taskid
                  Positive integer. Task ID.
                  Positive integer. Replication ID.
repid
                  Character string. Output folder.
output_folder
                  Logical. Overwrite existing output in output_folder.
overwrite
                  Logical. If integrity = TRUE, check for the output file integrity when overwrite
integrity
                  = FALSE.
                  Integer. Random seed.
seed
                  Logical. Run simulations for confidence intervals.
ci
                  Logical. Run simulations for parametric bootstrap confidence intervals.
pb
```

delta_t Numeric vector. Vector of time intervals.

R Positive integer. Number of Monte Carlo replications.

B Positive integer. Number of bootstrap samples.

Value

The output is saved as an external file in output_folder.

Author(s)

Ivan Jacob Agaloos Pesigan

SimIllustrationDynrBootPara

Simulation Replication - BootPara

Description

Simulation Replication - BootPara

Usage

```
SimIllustrationDynrBootPara(
   taskid,
   repid,
   output_folder,
   seed,
   suffix,
   overwrite,
   integrity,
   B,
   ncores = NULL
)
```

Arguments

taskid Positive integer. Task ID.

repid Positive integer. Replication ID. output_folder Character string. Output folder.

seed Integer. Random seed.

suffix Character string. Output of manCTMed:::.SimSuffix().
overwrite Logical. Overwrite existing output in output_folder.

integrity Logical. If integrity = TRUE, check for the output file integrity when overwrite

= FALSE.

B Positive integer. Number of bootstrap samples.

ncores Positive integer. Number of cores to use.

This function is executed via the IllustrationSim function.

Value

The output is saved as an external file in output_folder.

Author(s)

Ivan Jacob Agaloos Pesigan

```
SimIllustrationDynrBootParaStdXMY
```

Simulation Replication - BootParaStdXMY

Description

Simulation Replication - BootParaStdXMY

Usage

```
SimIllustrationDynrBootParaStdXMY(
  taskid,
  repid,
  output_folder,
  seed,
  suffix,
  overwrite,
  integrity,
  delta_t
)
```

Arguments

delta_t

repid Positive integer. Task ID.

repid Positive integer. Replication ID.

output_folder Character string. Output folder.

seed Integer. Random seed.

suffix Character string. Output of manCTMed:::.SimSuffix().

overwrite Logical. Overwrite existing output in output_folder.

integrity Logical. If integrity = TRUE, check for the output file integrity when overwrite = FALSE.

Numeric vector. Vector of time intervals.

This function is executed via the IllustrationSim function.

Value

The output is saved as an external file in output_folder.

Author(s)

Ivan Jacob Agaloos Pesigan

```
SimIllustrationDynrBootParaXMY
```

Simulation Replication - BootParaXMY

Description

Simulation Replication - BootParaXMY

Usage

```
SimIllustrationDynrBootParaXMY(
  taskid,
  repid,
  output_folder,
  seed,
  suffix,
  overwrite,
  integrity,
  delta_t
)
```

Arguments

taskid Positive integer. Task ID.

repid Positive integer. Replication ID. output_folder Character string. Output folder.

seed Integer. Random seed.

suffix Character string. Output of manCTMed:::.SimSuffix().

overwrite Logical. Overwrite existing output in output_folder.

integrity Logical. If integrity = TRUE, check for the output file integrity when overwrite

= FALSE.

delta_t Numeric vector. Vector of time intervals.

This function is executed via the IllustrationSim function.

Value

The output is saved as an external file in output_folder.

Author(s)

Ivan Jacob Agaloos Pesigan

```
SimIllustrationDynrDeltaStdXMY
```

Simulation Replication - Illustration (DynrDeltaStdXMY)

Description

Simulation Replication - Illustration (DynrDeltaStdXMY)

Usage

```
SimIllustrationDynrDeltaStdXMY(
  taskid,
  repid,
  output_folder,
  seed,
  suffix,
  overwrite,
  integrity,
  delta_t
)
```

Arguments

```
taskid
                  Positive integer. Task ID.
repid
                  Positive integer. Replication ID.
                  Character string. Output folder.
output_folder
                  Integer. Random seed.
seed
suffix
                  Character string. Output of manCTMed:::.SimSuffix().
overwrite
                  Logical. Overwrite existing output in output_folder.
integrity
                  Logical. If integrity = TRUE, check for the output file integrity when overwrite
                  = FALSE.
                  Numeric vector. Vector of time intervals.
delta_t
```

This function is executed via the IllustrationSim function.

Value

The output is saved as an external file in output_folder.

Author(s)

Ivan Jacob Agaloos Pesigan

```
SimIllustrationDynrDeltaXMY
```

Simulation Replication - Illustration (DynrDeltaXMY)

Description

Simulation Replication - Illustration (DynrDeltaXMY)

Usage

```
SimIllustrationDynrDeltaXMY(
   taskid,
   repid,
   output_folder,
   seed,
   suffix,
   overwrite,
   integrity,
   delta_t
)
```

Arguments

taskid Positive integer. Task ID.

repid Positive integer. Replication ID. output_folder Character string. Output folder.

seed Integer. Random seed.

suffix Character string. Output of manCTMed:::.SimSuffix().

overwrite Logical. Overwrite existing output in output_folder.

integrity Logical. If integrity = TRUE, check for the output file integrity when overwrite

= FALSE.

delta_t Numeric vector. Vector of time intervals.

This function is executed via the IllustrationSim function.

Value

The output is saved as an external file in output_folder.

Author(s)

Ivan Jacob Agaloos Pesigan

```
SimIllustrationDynrMCPhiSigma
```

Simulation Replication - Illustration (MCPhiSigma)

Description

Simulation Replication - Illustration (MCPhiSigma)

Usage

```
SimIllustrationDynrMCPhiSigma(
  taskid,
  repid,
  output_folder,
  seed,
  suffix,
  overwrite,
  integrity,
  R
)
```

Arguments

taskid Positive integer. Task ID.
repid Positive integer. Replication ID.
output_folder Character string. Output folder.

seed Integer. Random seed.

suffix Character string. Output of manCTMed:::.SimSuffix().

overwrite Logical. Overwrite existing output in output_folder.

integrity Logical. If integrity = TRUE, check for the output file integrity when overwrite

= FALSE.

R Positive integer. Number of Monte Carlo replications.

This function is executed via the IllustrationSim function.

Value

The output is saved as an external file in output_folder.

Author(s)

Ivan Jacob Agaloos Pesigan

SimIllustrationDynrMCStdXMY

Simulation Replication - Illustration (DynrMCStdXMY)

Description

Simulation Replication - Illustration (DynrMCStdXMY)

Usage

```
SimIllustrationDynrMCStdXMY(
   taskid,
   repid,
   output_folder,
   seed,
   suffix,
   overwrite,
   integrity,
   delta_t,
   R
)
```

Arguments

taskid Positive integer. Task ID.
repid Positive integer. Replication ID.
output_folder Character string. Output folder.
seed Integer. Random seed.

suffix Character string. Output of manCTMed:::.SimSuffix().
overwrite Logical. Overwrite existing output in output_folder.

integrity Logical. If integrity = TRUE, check for the output file integrity when overwrite

= FALSE.

delta_t Numeric vector. Vector of time intervals.

R Positive integer. Number of Monte Carlo replications.

This function is executed via the IllustrationSim function.

Value

The output is saved as an external file in output_folder.

Author(s)

Ivan Jacob Agaloos Pesigan

SimIllustrationDynrMCXMY

Simulation Replication - Illustration (DynrMCXMY)

Description

Simulation Replication - Illustration (DynrMCXMY)

Usage

```
SimIllustrationDynrMCXMY(
  taskid,
  repid,
  output_folder,
  seed,
  suffix,
  overwrite,
  integrity,
  delta_t,
  R
)
```

Arguments

taskid Positive integer. Task ID. repid Positive integer. Replication ID. output_folder Character string. Output folder. seed Integer. Random seed. suffix Character string. Output of manCTMed:::.SimSuffix(). overwrite Logical. Overwrite existing output in output_folder. integrity Logical. If integrity = TRUE, check for the output file integrity when overwrite = FALSE. Numeric vector. Vector of time intervals. delta_t Positive integer. Number of Monte Carlo replications. R

This function is executed via the IllustrationSim function.

Value

The output is saved as an external file in output_folder.

Author(s)

Ivan Jacob Agaloos Pesigan

SimIllustrationFitDynr

Simulation Replication - IllustrationFitDynr

Description

Simulation Replication - IllustrationFitDynr

Usage

```
SimIllustrationFitDynr(
  taskid,
  repid,
 output_folder,
  seed,
  suffix,
 overwrite,
  integrity
)
```

Arguments

taskid Positive integer. Task ID. Positive integer. Replication ID. repid output_folder Character string. Output folder.

Integer. Random seed. seed

suffix Character string. Output of manCTMed:::.SimSuffix(). overwrite Logical. Overwrite existing output in output_folder.

Logical. If integrity = TRUE, check for the output file integrity when overwrite integrity

= FALSE.

Details

This function is executed via the IllustrationSim function.

SimIllustrationFitMx 73

Value

The output is saved as an external file in output_folder.

Author(s)

Ivan Jacob Agaloos Pesigan

SimIllustrationFitMx Simulation Replication - IllustrationFitMx

Description

Simulation Replication - IllustrationFitMx

Usage

```
SimIllustrationFitMx(
  taskid,
  repid,
  output_folder,
  seed,
  suffix,
  overwrite,
  integrity
)
```

Arguments

taskid Positive integer. Task ID.

repid Positive integer. Replication ID. output_folder Character string. Output folder.

seed Integer. Random seed.

suffix Character string. Output of manCTMed:::.SimSuffix().
overwrite Logical. Overwrite existing output in output_folder.

integrity Logical. If integrity = TRUE, check for the output file integrity when overwrite

= FALSE.

Details

This function is executed via the IllustrationSim function.

Value

The output is saved as an external file in output_folder.

74 SimIllustrationGenData

Author(s)

Ivan Jacob Agaloos Pesigan

SimIllustrationGenData

Simulation Replication - IllustrationGenData

Description

Simulation Replication - IllustrationGenData

Usage

```
SimIllustrationGenData(
  taskid,
  repid,
  output_folder,
  seed,
  suffix,
  overwrite,
  integrity
)
```

Arguments

taskid Positive integer. Task ID.
repid Positive integer. Replication ID.
output_folder Character string. Output folder.
seed Integer. Random seed.

suffix Character string. Output of manCTMed:::.SimSuffix().

overwrite Logical. Overwrite existing output in output_folder.

integrity Logical. If integrity = TRUE, check for the output file integrity when overwrite

= FALSE.

Details

This function is executed via the IllustrationSim function.

Value

The output is saved as an external file in output_folder.

Author(s)

SimIllustrationPara 75

SimIllustrationPara Simulation Replication Parametric Bootstrap (Parallel)

Description

Simulation Replication Parametric Bootstrap (Parallel)

Usage

```
SimIllustrationPara(
  taskid,
  repid,
  output_folder,
  overwrite,
  integrity,
  seed,
  B
)
```

Arguments

taskid Positive integer. Task ID.

repid Positive integer. Replication ID.

output_folder Character string. Output folder.

overwrite Logical. Overwrite existing output in output_folder.

integrity Logical. If integrity = TRUE, check for the output file integrity when overwrite

= FALSE.

seed Integer. Random seed.

B Positive integer. Number of bootstrap samples.

Value

The output is saved as an external file in output_folder.

Author(s)

76 SimProj

SimPara	Simulation Replication Parametric Bootstrap (Parallel)

Description

Simulation Replication Parametric Bootstrap (Parallel)

Usage

```
SimPara(taskid, repid, output_folder, overwrite, integrity, seed, B)
```

Arguments

taskid Positive integer. Task ID.

repid Positive integer. Replication ID.

output_folder Character string. Output folder.

overwrite Logical. Overwrite existing output in output_folder.

integrity Logical. If integrity = TRUE, check for the output file integrity when overwrite = FALSE.

seed Integer. Random seed.

B Positive integer. Number of bootstrap samples.

Value

The output is saved as an external file in output_folder.

Author(s)

Ivan Jacob Agaloos Pesigan

SimProj	Simulation Project Name	

Description

Simulation Project Name

Usage

SimProj()

Value

Returns the project name as a character string.

Sum 77

Author(s)

Ivan Jacob Agaloos Pesigan

Sum Summary

Description

Summary

Usage

Sum(taskid, reps, output_folder, overwrite, integrity)

Arguments

taskid Positive integer. Task ID.

reps Positive integer. Number of replications.

output_folder Character string. Output folder.

overwrite Logical. Overwrite existing output in output_folder.

integrity Logical. If integrity = TRUE, check for the output file integrity when overwrite

= FALSE.

Value

The output is saved as an external file in output_folder.

Author(s)

Ivan Jacob Agaloos Pesigan

SumDynrDeltaStdXMY Summary (DynrDeltaStdXMY)

Description

Summary (DynrDeltaStdXMY)

Usage

SumDynrDeltaStdXMY(taskid, reps, output_folder, overwrite, integrity)

Arguments

taskid Positive integer. Task ID.

reps Positive integer. Number of replications.

output_folder Character string. Output folder.

overwrite Logical. Overwrite existing output in output_folder.

integrity Logical. If integrity = TRUE, check for the output file integrity when overwrite

= FALSE.

Details

This function is executed via the Sum function.

Value

The output is saved as an external file in output_folder.

Author(s)

Ivan Jacob Agaloos Pesigan

SumDynrDeltaStdYMX Summary (DynrDeltaStdYMX)

Description

Summary (DynrDeltaStdYMX)

Usage

SumDynrDeltaStdYMX(taskid, reps, output_folder, overwrite, integrity)

Arguments

taskid Positive integer. Task ID.

reps Positive integer. Number of replications.

output_folder Character string. Output folder.

overwrite Logical. Overwrite existing output in output_folder.

integrity Logical. If integrity = TRUE, check for the output file integrity when overwrite

= FALSE.

Details

This function is executed via the Sum function.

SumDynrDeltaXMY 79

Value

The output is saved as an external file in output_folder.

Author(s)

Ivan Jacob Agaloos Pesigan

SumDynrDeltaXMY Summary (DynrDeltaXMY)

Description

Summary (DynrDeltaXMY)

Usage

SumDynrDeltaXMY(taskid, reps, output_folder, overwrite, integrity)

Arguments

taskid Positive integer. Task ID.

reps Positive integer. Number of replications.

output_folder Character string. Output folder.

overwrite Logical. Overwrite existing output in output_folder.

integrity Logical. If integrity = TRUE, check for the output file integrity when overwrite

= FALSE.

Details

This function is executed via the Sum function.

Value

The output is saved as an external file in output_folder.

Author(s)

SumDynrDeltaYMX	Summary (DynrDeltaYMX)
Juliby III DCI Call IX	Summary (Bym Benarmar)

Description

Summary (DynrDeltaYMX)

Usage

```
SumDynrDeltaYMX(taskid, reps, output_folder, overwrite, integrity)
```

Arguments

taskid Positive integer. Task ID.

reps Positive integer. Number of replications.

output_folder Character string. Output folder.

overwrite Logical. Overwrite existing output in output_folder.

integrity Logical. If integrity = TRUE, check for the output file integrity when overwrite

= FALSE.

Details

This function is executed via the Sum function.

Value

The output is saved as an external file in output_folder.

Author(s)

Ivan Jacob Agaloos Pesigan

SumDynrMCStdXMY Summary (DynrMCStdXMY)

Description

Summary (DynrMCStdXMY)

Usage

SumDynrMCStdXMY(taskid, reps, output_folder, overwrite, integrity)

SumDynrMCStdYMX 81

Arguments

taskid Positive integer. Task ID.

reps Positive integer. Number of replications.

output_folder Character string. Output folder.

overwrite Logical. Overwrite existing output in output_folder.

integrity Logical. If integrity = TRUE, check for the output file integrity when overwrite

= FALSE.

Details

This function is executed via the Sum function.

Value

The output is saved as an external file in output_folder.

Author(s)

Ivan Jacob Agaloos Pesigan

SumDynrMCStdYMX Summary (DynrMCStdYMX)

Description

Summary (DynrMCStdYMX)

Usage

SumDynrMCStdYMX(taskid, reps, output_folder, overwrite, integrity)

Arguments

taskid Positive integer. Task ID.

reps Positive integer. Number of replications.

output_folder Character string. Output folder.

overwrite Logical. Overwrite existing output in output_folder.

integrity Logical. If integrity = TRUE, check for the output file integrity when overwrite

= FALSE.

Details

This function is executed via the Sum function.

82 SumDynrMCXMY

Value

The output is saved as an external file in output_folder.

Author(s)

Ivan Jacob Agaloos Pesigan

SumDynrMCXMY Summary (DynrMCXMY)

Description

Summary (DynrMCXMY)

Usage

SumDynrMCXMY(taskid, reps, output_folder, overwrite, integrity)

Arguments

taskid Positive integer. Task ID.

reps Positive integer. Number of replications.

output_folder Character string. Output folder.

overwrite Logical. Overwrite existing output in output_folder.

integrity Logical. If integrity = TRUE, check for the output file integrity when overwrite

= FALSE.

Details

This function is executed via the Sum function.

Value

The output is saved as an external file in output_folder.

Author(s)

SumDynrMCYMX 83

ary (DynrMCYMX)
iry (DynimCim

Description

Summary (DynrMCYMX)

Usage

```
SumDynrMCYMX(taskid, reps, output_folder, overwrite, integrity)
```

Arguments

taskid Positive integer. Task ID.

reps Positive integer. Number of replications.

output_folder Character string. Output folder.

overwrite Logical. Overwrite existing output in output_folder.

integrity Logical. If integrity = TRUE, check for the output file integrity when overwrite

= FALSE.

Details

This function is executed via the Sum function.

Value

The output is saved as an external file in output_folder.

Author(s)

Ivan Jacob Agaloos Pesigan

SumFitDynr Summary (FitDynr)

Description

Summary (FitDynr)

Usage

SumFitDynr(taskid, reps, output_folder, overwrite, integrity)

84 SumIllustration

Arguments

taskid Positive integer. Task ID.

reps Positive integer. Number of replications.

output_folder Character string. Output folder.

overwrite Logical. Overwrite existing output in output_folder.

integrity Logical. If integrity = TRUE, check for the output file integrity when overwrite

= FALSE.

Details

This function is executed via the Sum function.

Value

The output is saved as an external file in output_folder.

Author(s)

Ivan Jacob Agaloos Pesigan

SumIllustration Summary (Illustration)

Description

Summary (Illustration)

Usage

SumIllustration(taskid, reps, output_folder, overwrite, integrity)

Arguments

taskid Positive integer. Task ID.

reps Positive integer. Number of replications.

output_folder Character string. Output folder.

overwrite Logical. Overwrite existing output in output_folder.

integrity Logical. If integrity = TRUE, check for the output file integrity when overwrite

= FALSE.

Value

The output is saved as an external file in output_folder.

Author(s)

 ${\tt SumIllustrationDynrBootParaStdXMY}$

Summary - Illustration (DynrBootParaStdXMY)

Description

Summary - Illustration (DynrBootParaStdXMY)

Usage

```
SumIllustrationDynrBootParaStdXMY(
  taskid,
  reps,
  output_folder,
  overwrite,
  integrity,
  type = "pc"
)
```

Arguments

taskid Positive integer. Task ID.

reps Positive integer. Number of replications.

output_folder Character string. Output folder.

overwrite Logical. Overwrite existing output in output_folder.

integrity Logical. If integrity = TRUE, check for the output file integrity when overwrite

= FALSE.

type Character string. Confidence interval type.

Details

This function is executed via the IllustrationSum function.

Value

The output is saved as an external file in output_folder.

Author(s)

 ${\tt SumIllustrationDynrBootParaXMY}$

Summary - Illustration (DynrBootParaXMY)

Description

Summary - Illustration (DynrBootParaXMY)

Usage

```
SumIllustrationDynrBootParaXMY(
   taskid,
   reps,
   output_folder,
   overwrite,
   integrity,
   type = "pc"
)
```

Arguments

taskid Positive integer. Task ID.

reps Positive integer. Number of replications.

output_folder Character string. Output folder.

overwrite Logical. Overwrite existing output in output_folder.

integrity Logical. If integrity = TRUE, check for the output file integrity when overwrite

= FALSE.

type Character string. Confidence interval type.

Details

This function is executed via the IllustrationSum function.

Value

The output is saved as an external file in output_folder.

Author(s)

 ${\tt SumIllustrationDynrDeltaStdXMY}$

Summary - Illustration (DynrDeltaStdXMY)

Description

Summary - Illustration (DynrDeltaStdXMY)

Usage

```
SumIllustrationDynrDeltaStdXMY(
  taskid,
  reps,
  output_folder,
  overwrite,
  integrity
)
```

Arguments

taskid Positive integer. Task ID.

reps Positive integer. Number of replications.

output_folder Character string. Output folder.

overwrite Logical. Overwrite existing output in output_folder.

integrity Logical. If integrity = TRUE, check for the output file integrity when overwrite

= FALSE.

Details

This function is executed via the IllustrationSum function.

Value

The output is saved as an external file in output_folder.

Author(s)

SumIllustrationDynrDeltaXMY

Summary - Illustration (DynrDeltaXMY)

Description

Summary - Illustration (DynrDeltaXMY)

Usage

SumIllustrationDynrDeltaXMY(taskid, reps, output_folder, overwrite, integrity)

Arguments

taskid Positive integer. Task ID.

reps Positive integer. Number of replications.

output_folder Character string. Output folder.

overwrite Logical. Overwrite existing output in output_folder.

integrity Logical. If integrity = TRUE, check for the output file integrity when overwrite

= FALSE.

Details

This function is executed via the IllustrationSum function.

Value

The output is saved as an external file in output_folder.

Author(s)

Ivan Jacob Agaloos Pesigan

 ${\tt SumIllustrationDynrMCStdXMY}$

Summary - Illustration (DynrMCStdXMY)

Description

Summary - Illustration (DynrMCStdXMY)

Usage

SumIllustrationDynrMCStdXMY(taskid, reps, output_folder, overwrite, integrity)

Arguments

taskid Positive integer. Task ID.

reps Positive integer. Number of replications.

output_folder Character string. Output folder.

overwrite Logical. Overwrite existing output in output_folder.

integrity Logical. If integrity = TRUE, check for the output file integrity when overwrite

= FALSE.

Details

This function is executed via the IllustrationSum function.

Value

The output is saved as an external file in output_folder.

Author(s)

Ivan Jacob Agaloos Pesigan

SumIllustrationDynrMCXMY

Summary - Illustration (DynrMCXMY)

Description

Summary - Illustration (DynrMCXMY)

Usage

SumIllustrationDynrMCXMY(taskid, reps, output_folder, overwrite, integrity)

Arguments

taskid Positive integer. Task ID.

reps Positive integer. Number of replications.

output_folder Character string. Output folder.

overwrite Logical. Overwrite existing output in output_folder.

integrity Logical. If integrity = TRUE, check for the output file integrity when overwrite

= FALSE.

Details

This function is executed via the IllustrationSum function.

Value

The output is saved as an external file in output_folder.

Author(s)

Ivan Jacob Agaloos Pesigan

 ${\tt SumIllustrationFitDynr}$

Summary - Illustration (FitDynr)

Description

Summary - Illustration (FitDynr)

Usage

SumIllustrationFitDynr(taskid, reps, output_folder, overwrite, integrity)

Arguments

taskid Positive integer. Task ID.

reps Positive integer. Number of replications.

 $output_folder \quad Character\ string.\ Output\ folder.$

overwrite Logical. Overwrite existing output in output_folder.

integrity Logical. If integrity = TRUE, check for the output file integrity when overwrite

= FALSE.

Details

This function is executed via the IllustrationSum function.

Value

The output is saved as an external file in output_folder.

Author(s)

ThetaHat 91

ThetaHat

Estimated Drift Matrix and Process Noise

Description

The function extracts the estimated drift matrix and process noise from the fitted model.

Usage

```
ThetaHat(fit)
```

Arguments

fit

R object. Output of the FitDynr(), FitMx(), IllustrationFitDynr(), or IllustrationFitMx(), functions.

See Also

```
Other Model Fitting Functions: FitDynr(), FitMx(), IllustrationFitDynr(), IllustrationFitMx(), IllustrationMCPhiSigma(), IllustrationPrepData(), PhiHat()
```

Examples

```
## Not run:
set.seed(42)
library(dynr)
sim <- GenData(n = 50)
data <- RandomMeasurement(sim)
fit <- FitDynr(data)
ThetaHat(fit)
## End(Not run)</pre>
```

Index

* Compression Functions	$Illustration {\tt FigScatterPlotSeBias},$
Compress, 11	27
IllustrationCompress, 24	* Model Fitting Functions
* Confidence Interval Functions	FitDynr, 21
BootPara, 4	FitMx, 21
BootParaStdXMY, 5	IllustrationFitDynr,28
BootParaStdXYM, 6	IllustrationFitMx, 28
BootParaStdYMX, 7	IllustrationMCPhiSigma, 30
BootParaXMY, 8	IllustrationPrepData, 30
BootParaXYM, 9	PhiHat, 43
BootParaYMX, 10	ThetaHat, 91
DeltaStdXMY, 12	* ci
DeltaStdXYM, 12	BootPara, 4
DeltaStdYMX, 13	BootParaStdXMY, 5
DeltaXMY, 14	BootParaStdXYM, 6
DeltaXYM, 15	BootParaStdYMX, 7
DeltaYMX, 16	BootParaXMY, 8
IllustrationBootPara, 23	BootParaXYM, 9
MCStdXMY, 37	BootParaYMX, 10
MCStdXYM, 38	DeltaStdXMY, 12
MCStdYMX, 39	DeltaStdXYM, 12
MCXMY, 40	DeltaStdYMX, 13
MCXYM, 41	DeltaXMY, 14
MCYMX, 42	DeltaXYM, 15
* Data Generation Functions	DeltaYMX, 16
GenData, 22	IllustrationBootPara, 23
IllustrationGenData, 29	IllustrationMCPhiSigma, 30
RandomMeasurement, 44	MCStdXMY, 37
* Figure Functions	MCStdXYM, 38
FigPlotEffects, 16	MCStdYMX, 39
FigScatterPlotCoverage, 17	MCXMY, 40
FigScatterPlotPower, 18	MCXYM, 41
FigScatterPlotSeBias, 19	MCYMX, 42
FigScatterPlotType1, 20	PhiHat, 43
IllustrationFigPlotEffects, 25	SimDynrBootPara, 47
IllustrationFigScatterPlotCoverage,	SimDynrBootParaStdXMY, 48
25	SimDynrBootParaStdYMX, 49
IllustrationFigScatterPlotPower,	SimDynrBootParaXMY, 50
26	SimDynrBootParaYMX, 51

SimDynrDeltaStdXMY, 52	FitMx, 21
SimDynrDeltaStdYMX, 53	IllustrationFitDynr, 28
SimDynrDeltaXMY, 54	IllustrationFitMx, 28
SimDynrDeltaYMX, 55	SimFitDynr, 60
SimDynrMCStdXMY, 56	SimFitMx, 61
SimDynrMCStdYMX, 57	SimIllustrationFitDynr, 72
SimDynrMCXMY, 58	SimIllustrationFitMx, 73
SimDynrMCYMX, 59	* gendata
SimIllustrationDynrBootPara,64	GenData, 22
SimIllustrationDynrBootParaStdXMY,	IllustrationGenData, 29
65	IllustrationPrepData, 30
SimIllustrationDynrBootParaXMY,66	RandomMeasurement, 44
SimIllustrationDynrDeltaStdXMY, 67	SimGenData, 62
SimIllustrationDynrDeltaXMY, 68	SimIllustrationGenData, 74
SimIllustrationDynrMCPhiSigma, 69	* illustration
SimIllustrationDynrMCStdXMY, 70	illustration_dist, 31
SimIllustrationDynrMCXMY, 71	illustration_dist_dt, 32
ThetaHat, 91	illustration_dist_dt_mc, 32
* compress	illustration_dist_mc, 33
Compress, 11	illustration_dist_med, 33
IllustrationCompress, 24	illustration_dist_med_mc, 34
* data	illustration_dist_med_std, 34
illustration_dist, 31	illustration_dist_med_std_mc, 35
illustration_dist_dt, 32	illustration_results, 35
illustration_dist_dt_mc, 32	IllustrationBootPara, 23
illustration_dist_mc, 33	IllustrationFigScatterPlotCoverage,
illustration_dist_med, 33	25
illustration_dist_med_mc, 34	IllustrationFigScatterPlotPower,
illustration_dist_med_std, 34	26
illustration_dist_med_std_mc, 35	IllustrationFigScatterPlotSeBias,
illustration_results, 35	27
params, 43	IllustrationFitDynr, 28
results, 45	IllustrationFitMx, 28
* figure	IllustrationGenData, 29
FigPlotEffects, 16	IllustrationMCPhiSigma, 30
FigScatterPlotCoverage, 17	IllustrationPrepData, 30
FigScatterPlotPower, 18	SimIllustration, 63
FigScatterPlotSeBias, 19	SimIllustrationDynrBootPara, 64
FigScatterPlotType1, 20	SimIllustrationDynrBootParaStdXMY,
IllustrationFigPlotEffects, 25	65
IllustrationFigScatterPlotCoverage,	SimIllustrationDynrBootParaXMY,66
25	SimIllustrationDynrDeltaStdXMY, 67
IllustrationFigScatterPlotPower,	SimIllustrationDynrDeltaXMY, 68
26	SimIllustrationDynrMCPhiSigma, 69
IllustrationFigScatterPlotSeBias,	SimIllustrationDynrMCStdXMY, 70
27	SimIllustrationDynrMCXMY, 71
* fit	SimIllustrationFitDynr, 72
* M FitDynr, 21	SimIllustrationFitMx, 73
i i coyiii , 41	SIMITITUS CI ACTOMI I CINA, 13

SimIllustrationGenData, 74	MCStdXMY, 37
SimIllustrationPara, 75	MCStdXYM, 38
SumIllustration, 84	MCStdYMX, 39
SumIllustrationDynrBootParaStdXMY,	MCXMY, 40
85	MCXYM, 41
SumIllustrationDynrBootParaXMY, 86	MCYMX, 42
SumIllustrationDynrDeltaStdXMY, 87	PhiHat, 43
SumIllustrationDynrDeltaXMY,88	RandomMeasurement, 44
SumIllustrationDynrMCStdXMY,88	Sim, 46
SumIllustrationDynrMCXMY,89	SimDynrBootPara, 47
SumIllustrationFitDynr, 90	SimDynrBootParaStdXMY, 48
* manCTMed	SimDynrBootParaStdYMX, 49
BootPara, 4	SimDynrBootParaXMY, 50
BootParaStdXMY, 5	SimDynrBootParaYMX, 51
BootParaStdXYM, 6	SimDynrDeltaStdXMY, 52
BootParaStdYMX, 7	SimDynrDeltaStdYMX, 53
BootParaXMY, 8	SimDynrDeltaXMY, 54
BootParaXYM, 9	SimDynrDeltaYMX, 55
BootParaYMX, 10	SimDynrMCStdXMY, 56
Compress, 11	SimDynrMCStdYMX, 57
DeltaStdXMY, 12	SimDynrMCXMY, 58
DeltaStdXYM, 12	SimDynrMCYMX, 59
DeltaStdYMX, 13	SimFitDynr, 60
DeltaXMY, 14	SimFitMx, 61
DeltaXYM, 15	SimFN, 62
DeltaYMX, 16	SimGenData, 62
FigPlotEffects, 16	SimIllustration, 63
FigScatterPlotCoverage, 17	SimIllustrationDynrBootPara, 64
FigScatterPlotPower, 18	SimIllustrationDynrBootParaStdXMY
FigScatterPlotSeBias, 19	65
FigScatterPlotType1, 20	SimIllustrationDynrBootParaXMY, 66
FitDynr, 21	SimIllustrationDynrDeltaStdXMY, 67
FitMx, 21	SimIllustrationDynrDeltaXMY, 68
GenData, 22	SimIllustrationDynrMCPhiSigma, 69
IllustrationBootPara, 23	${\sf SimIllustrationDynrMCStdXMY}, 70$
IllustrationCompress, 24	SimIllustrationDynrMCXMY, 71
IllustrationFigPlotEffects, 25	SimIllustrationFitDynr, 72
${\tt Illustration Fig Scatter Plot Coverage},$	SimIllustrationFitMx, 73
25	${\sf SimIllustrationGenData}, 74$
$Illustration {\tt FigScatterPlotPower},$	SimIllustrationPara, 75
26	SimPara, 76
$Illustration {\tt FigScatterPlotSeBias},$	SimProj, 76
27	Sum, 77
IllustrationFitDynr, 28	SumDynrDeltaStdXMY, 77
IllustrationFitMx, 28	SumDynrDeltaStdYMX, 78
IllustrationGenData, 29	SumDynrDeltaXMY, 79
IllustrationMCPhiSigma, 30	SumDynrDeltaYMX, 80
IllustrationPrepData, 30	SumDynrMCStdXMY, 80

	SumDynrMCStdYMX, 81	* summary
	SumDynrMCXMY, 82	Sum, 77
	SumDynrMCYMX, 83	SumDynrDeltaStdXMY, 77
	SumFitDynr, 83	SumDynrDeltaStdYMX, 78
	SumIllustration, 84	SumDynrDeltaXMY, 79
	SumIllustrationDynrBootParaStdXMY,	SumDynrDeltaYMX, 80
	85	SumDynrMCStdXMY, 80
	SumIllustrationDynrBootParaXMY, 86	SumDynrMCStdYMX, 81
	SumIllustrationDynrDeltaStdXMY, 87	SumDynrMCXMY, 82
	SumIllustrationDynrDeltaXMY, 88	SumDynrMCYMX, 83
	SumIllustrationDynrMCStdXMY,88	SumFitDynr, 83
	SumIllustrationDynrMCXMY, 89	SumIllustration, 84
	SumIllustrationFitDynr, 90	${\sf SumIllustrationDynrBootParaStdXMY},$
	ThetaHat, 91	85
* p	arameters	SumIllustrationDynrBootParaXMY, 86
	params, 43	SumIllustrationDynrDeltaStdXMY, 87
	results, 45	SumIllustrationDynrDeltaXMY, 88
∗ si	imulation	SumIllustrationDynrMCStdXMY, 88
	Sim, 46	SumIllustrationDynrMCXMY, 89
	SimDynrBootPara, 47	SumIllustrationFitDynr, 90
	SimDynrBootParaStdXMY, 48	
	SimDynrBootParaStdYMX, 49	BootPara, 4, 5–10, 12–16, 23, 37–42
	SimDynrBootParaXMY, 50	BootPara(), 5–10
	SimDynrBootParaYMX, 51	BootParaStdXMY, 5, 5–10, 12–16, 23, 37–42
	SimDynrDeltaStdXMY, 52	BootParaStdXYM, 5, 6, 7–10, 12–16, 23, 37–42
	SimDynrDeltaStdYMX, 53	BootParaStdYMX, 5, 6, 7, 8–10, 12–16, 23,
	SimDynrDeltaXMY, 54	37–42
	SimDynrDeltaYMX, 55	BootParaXMY, 5–7, 8, 9, 10, 12–16, 23, 37–42
	SimDynrMCStdXMY, 56	BootParaXYM, 5–8, 9, 10, 12–16, 23, 37–42
	SimDynrMCStdYMX, 57	BootParaYMX, 5-9, 10, 12-16, 23, 37-42
	SimDynrMCXMY, 58	Compress, 11, 24
	SimDynrMCYMX, 59	Compr ess, 11, 24
	SimFitDynr, 60	DeltaStdXMY, 5-10, 12, 13-16, 23, 37-42
	SimFitMx, 61	DeltaStdXYM, 5–10, 12, 12, 14–16, 23, 37–42
	SimFN, 62	DeltaStdYMX, 5–10, 12, 13, 13–16, 23, 37–42
	SimGenData, 62	DeltaXMY, 5-10, 12, 13, 14, 14-16, 23, 37-42
	SimPara, 76	DeltaXYM, 5-10, 12-14, 15, 16, 23, 37-42
	SimProj, 76	DeltaYMX, 5-10, 12-15, 16, 23, 37-42
	Sum, 77	dynr, 21, 28
	SumDynrDeltaStdXMY,77	. , ==, ==
	SumDynrDeltaStdYMX, 78	FigPlotEffects, 16, 18-20, 25-27
	SumDynrDeltaXMY, 79	FigScatterPlotCoverage, 17, 17–20, 25–27
	SumDynrDeltaYMX, 80	FigScatterPlotPower, 17, 18, 18–20, 25–27
	SumDynrMCStdXMY, 80	FigScatterPlotSeBias, 17, 18, 19, 20,
	SumDynrMCStdYMX, 81	25–27
	SumDynrMCXMY, 82	FigScatterPlotType1, 17-19, 20, 25-27
	SumDynrMCYMX, 83	FitDynr, 21, 22, 28–31, 43, 91
	SumFitDynr, 83	FitDynr(), 4, 43, 91

FitMx, 21, 21, 28–31, 43, 91	PhiHat, 21, 22, 28-31, 43, 91
FitMx(), 4, 43, 91	PhiHat(), 8-10, 14-16, 40-42
GenData, 22, 29, 44	RandomMeasurement, 22, 29, 44
GenData(), 44	RandomMeasurement(), 21, 22
illustration_dist, 31	results, 45
illustration_dist_dt, 32	Sim, 46
illustration_dist_dt_mc, 32	SimDynrBootPara, 47
illustration_dist_mc, 33	SimDynrBootParaStdXMY, 48
illustration_dist_med, 33	SimDynrBootParaStdYMX, 49
illustration_dist_med_mc, 34	SimDynrBootParaXMY, 50
illustration_dist_med_std, 34	SimDynrBootParaYMX, 51
illustration_dist_med_std_mc, 35	SimDynrDeltaStdXMY, 52
illustration_results, 35	SimDynrDeltaStdYMX, 53
IllustrationBootPara, $5-10$, $12-16$, 23 ,	SimDynrDeltaXMY, 54
37–42	SimDynrDeltaYMX, 55
IllustrationCompress, 11, 24	SimDynrMCStdXMY, 56
IllustrationFigPlotEffects, 17-20, 25,	SimDynrMCStdYMX, 57
26, 27	SimDynrMCXMY, 58
IllustrationFigScatterPlotCoverage,	SimDynrMCYMX, 59
17–20, 25, 25–27	SimFitDynr, 60
IllustrationFigScatterPlotPower, 17–20,	SimFitMx, 61
25, 26, 26, 27	SimFN, 62
IllustrationFigScatterPlotSeBias,	SimGenData, 62
17–20, 25, 26, 27	SimIllustration, 63
IllustrationFitDynr, 21, 22, 28, 29–31, 43,	SimIllustrationDynrBootPara, 64
91	SimIllustrationDynrBootParaStdXMY, 65
IllustrationFitDynr(), 4, 43, 91	SimIllustrationDynrBootParaXMY, 66
IllustrationFitMx, 21, 22, 28, 28, 30, 31,	SimIllustrationDynrDeltaStdXMY, 67
43, 91	SimIllustrationDynrDeltaXMY, 68
IllustrationFitMx(), 4 , 43 , 91	SimIllustrationDynrMCPhiSigma, 69
IllustrationGenData, 22, 29, 44	SimIllustrationDynrMCStdXMY, 70
IllustrationGenData(), 30, 31	SimIllustrationDynrMCXMY, 71
IllustrationMCPhiSigma, 21, 22, 28, 29, 30,	SimIllustrationFitDynr, 72
31, 43, 91	SimIllustrationFitMx, 73
IllustrationPrepData, 21, 22, 28, 29, 30,	SimIllustrationGenData, 74
30, 43, 91	SimIllustrationPara, 75
IllustrationPrepData(), 28	SimPara, 76
MCStdXMY, 5-10, 12-16, 23, 37, 38-42	SimProj, 76
MCStdXYM, 5–10, 12–16, 23, 37, 38, 39–42	<pre>simStateSpace::SimSSMOUFixed(), 22, 29</pre>
MCStdYMX, 5–10, 12–16, 23, 37, 38, 39–42 MCStdYMX, 5–10, 12–16, 23, 37, 38, 39, 40–42	Sum, 77
MCXMY, 5–10, 12–16, 23, 37, 38, 39, 40–42 MCXMY, 5–10, 12–16, 23, 37–39, 40, 41, 42	SumDynrDeltaStdXMY, 77
MCXYM, 5–10, 12–16, 23, 37–39, 40, 41, 42	SumDynrDeltaStdYMX, 78
MCYMX, 5–10, 12–16, 23, 37–40, 41, 42	SumDynrDeltaXMY, 79
He HM, J=10, 12=10, 2J, J/=+1, 42	SumDynrDeltaYMX, 80
OpenMx, 21, 28	SumDynrMCStdXMY, 80
	SumDynrMCStdYMX, 81
params, 43	SumDynrMCXMY, 82

```
SumDynrMCYMX, 83
SumFitDynr, 83
SumIllustration, 84
SumIllustrationDynrBootParaStdXMY, 85
SumIllustrationDynrBootParaXMY, 86
SumIllustrationDynrDeltaStdXMY, 87
SumIllustrationDynrDeltaXMY, 88
SumIllustrationDynrMCStdXMY, 88
SumIllustrationDynrMCXMY, 89
SumIllustrationFitDynr, 90
ThetaHat, 21, 22, 28-31, 43, 91
ThetaHat(), 5-7, 12, 13, 37-39
```