Package ‘GSA.UN’

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AMA

Data

AMA

Description

This function calculates the AMA indices: AMAE, AMA V , AMAV and AMAK.

Usage

AMA(data_Bstat, CM, pp_names, steps = 100)

Arguments

data_Bstat a data frame of dimensions t x 6, here t is the number of temporary steps and each column corresponds to a statistical measure: mean, variance, skewness, kurtosis and excess kurtosis.

CM A list of arrays, each array corresponds to the conditional moments calculated with the mean, variance, skewness, kurtosis. Each array has dimensions of steps, t, p.

pp_names vector that contains the names of the parameters (pp)

steps number of divisions of the parametric range

Value

A list of four matrices, which corresponds to AMAE, AMAV, AMAR and AMAK indices. Each matrix has dimensions of t x pp.

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References


Examples

```r
data("data_Bstat", "CM", "pp_names")
AMA_indices <- AMA(data_Bstat, CM, pp_names, steps= 15)
```

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**Bstat**

Basic statistical measures of a mathematical model results

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**Description**

This function calculates the mean, variance, skewness, kurtosis and excess kurtosis of a model output, this output can be given for different temporal periods (days, months or years).

**Usage**

```r
Bstat(out_set)
```

**Arguments**

- `out_set` matrix of dimensions n x t, where n equals the number of runs and t is equal to the number of temporary steps.

**Value**

a data frame of dimensions t x 6, here t is the number of temporary steps and each column corresponds to a statistical measure: mean, variance, skewness, kurtosis and excess kurtosis.

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**Examples**

```r
data("out_set")
data_Bstat <- Bstat(out_set)
```
Cond_Moments

Description

@description Data generated by Cond_Moments example

Usage

CM

Format

A list

CM A list of arrays, each array has dimensions of steps, t, pp

Author(s)

Camila Garcia-Echeverri

Cond_Moments Conditional statistical moments of a model output

Description

This function evaluates the first four statistical moments after grouping the model output by different parametric ranges.

Usage

Cond_Moments(parameters_set, out_set, pp_names, steps = 100)

Arguments

parameters_set matrix of dimensions n x pp, where n is the number of runs and pp is the number of parameters.

out_set matrix of dimensions n x t, where n is the number of runs and t is the number of temporary steps.

pp_names vector that contains the names of the parameters.

steps number of divisions of the parametric range.

Value

A list of arrays, each array has dimensions of steps, t, pp.
**data_Bstat**

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**Examples**

```r
data("parameters_set", "out_set", "pp_names")

CM <- Cond_Moments(parameters_set, out_set, pp_names, steps=15)
```

---

**data_Bstat**  
@title First four conditional moments of example data

---

**Description**

@description Data generated with the example of the function Cond_Moments

**Usage**

```r
data_Bstat
```

**Format**

A data.frame

```r
data_Bstat  a data frame of dimensions t x 6
```

**Author(s)**

Camila Garcia-Echeverri

**Source**

Function Bstat
**GSAtool**

**Global Sensitivity Analysis tool**

**Description**

This function performs the global sensitivity analysis starting from the gross results of the model.

**Usage**

```r
GSAtool(
  parameters_set,  
  out_set,  
  pp_names,  
  steps = 100,  
  save = FALSE,  
  dir = NULL  
)
```

**Arguments**

- `parameters_set` matrix of dimensions n x pp, where n is the number of runs and pp is the number of parameters.
- `out_set` matrix of dimensions n x t, where n is the number of runs and t is the number of temporary steps.
- `pp_names` a strings vector with the names of the parameters of the model
- `steps` number of divisions of the parametric range.
- `save` T to save the results in .csv files, by default save=F.
- `dir` a directory to save the results

**Value**

a list containing two outputs: SOBOL and AMA indices.

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out_set

References


Examples

```r
data("parameters_set", "out_set", "pp_names")

GSA_results <- GSAtool(parameters_set, out_set, pp_names, steps = 15, save=FALSE)
```

@title Results of a sample model

Description

@description Output generated with an example mathematical model.

Usage

out_set

Format

A matrix

out_set  a matrix of dimensions 500 x 365 (pp x t), runs of the model x temporary steps (365 days)

References

parameters_set  

@title Set of parameters randomly generated

Description

@description It contains 10 parameters

Usage

parameters_set

Format

A matrix

parameters_set a matrix of dimensions 500 x 10 (n x pp), runs of the model x number of parameters

References


pp_names  

@title Example - parameters names

Description

@description 10 parameters names.

Usage

pp_names

Format

A value

pp_names a vector of characters

Author(s)

CGE

References

save_results  Save GSA results

Description

This function helps to save the results in .csv format

Usage

```r
save_results(
  SOBOL = NULL,
  SOBOL_total = NULL,
  amae = NULL,
  amav = NULL,
  amar = NULL,
  amak = NULL,
  dir
)
```

Arguments

- **SOBOL**: SOBOL index
- **SOBOL_total**: SOBOL_total
- **amae**: AMAE index
- **amav**: AMAV index
- **amar**: AMAR index
- **amak**: AMAK index
- **dir**: a directory to save the results

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**SOBOL**

**SOBOL indices**

**Description**

This function calculates the first order and total SOBOL indices.

**Usage**

```
SOBOL(data_var, CM_mean, CM_var, pp_names)
```

**Arguments**

- `data_var`: a vector containing the variance of the model output for each modelling time step.
- `CM_mean`:
  An array containing the conditional mean of each parameter of the model. This array has dimensions of steps x t x pp, where steps is the number of divisions of the parametric range, t is the number of temporary steps and pp the number of parameters of the model.
- `CM_var`:
  An array containing the conditional variance of each parameter of the model. This array has dimensions of steps x t x pp, where steps is the number of divisions of the parametric range, t is the number of temporary steps and pp the number of parameters of the model.
- `pp_names`:
  a strings vector with the names of the parameters of the model.

**Value**

a list containing two matrices. The first contains the first order sobol, the second sobol_total.

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**References**


**Examples**

```r
data("data_Bstat", "CM", "pp_names")
SOBOL_indices <- SOBOL(data_Bstat[,3], CM$CM_mean, CM$CM_var , pp_names)
```
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