

Package ‘dgdecomp’

January 14, 2020

Type Package

Title Das Gupta Decomposition on Multiplicative Factors

Version 1.1.0

Description Takes any P number of factors, and decomposes them into additive factors.

Encoding UTF-8

LazyData TRUE

URL <https://github.com/sadatnfs/dgdecomp>

BugReports <https://github.com/sadatnfs/dgdecomp/issues>

NeedsCompilation yes

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LinkingTo Rcpp, RcppArmadillo

Depends data.table, Rcpp, RcppArmadillo

Suggests assertthat, testthat, foreach, data.table, matrixStats, MASS,
knitr, rmarkdown

VignetteBuilder knitr

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RoxygenNote 6.1.1

RemoteType github

RemoteHost api.github.com

RemoteRepo dgdecomp

RemoteUsername sadatnfs

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RemoteSha 545f88d3b3677b192c3fca1b5a4cf0c39d2bef9a

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GithubRepo dgdecomp

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GithubSubdir dgdecomp

Archs i386, x64

R topics documented:

dgdecomp-package	<i>Das Gupta Decomposition on Multiplicative Factors</i>
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Description

Takes any P number of factors, and decomposes them into additive factors.

Details

The DESCRIPTION file:

```
Package:          dgdecomp
Type:             Package
Title:            Das Gupta Decomposition on Multiplicative Factors
Version:          1.1.0
Authors@R:        person("Nafis", "Sadat", email = "sadatnfs@gmail.com", role = c("aut", "cre"))
Description:       Takes any P number of factors, and decomposes them into additive factors.
Encoding:          UTF-8
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Author:           Nafis Sadat [aut]
Maintainer:        Nafis Sadat <sadatnfs@gmail.com>
LinkingTo:         Rcpp, RcppArmadillo
Depends:           data.table, Rcpp, RcppArmadillo
Suggests:          assertthat, testthat, foreach, data.table, matrixStats, MASS, knitr, rmarkdown
VignetteBuilder:   knitr
License:           MIT + file LICENSE
RoxygenNote:       6.1.1
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Index of help topics:

Decomp_Factors	Compute the marginal decomposition effects from given input
Decomp_on_DT	Apply DG Decomposition to data.table columns

Func_Create_Combn	Compute the combination of all positions of the given factor segmented into two pieces
Func_Cross	Compute the combination of all the elements of the given vectors corresponding to the given sizes (using Func_Create_Combn)
Func_Dem	Compute the denominator of the inner sums in the DG Decomposition
Func_Inner	Compute the fraction for the inner sum in the DG Decomposition where all the params gets passed to Func_Num() and Func_Den()
Func_Inner_Sum	Sum over all inner sums for the DG Decomposition
Func_Num	Compute the numerator of the inner sums in the DG Decomposition
dgdecomp-package	Das Gupta Decomposition on Multiplicative Factors
simulate_decomp_data	Simulate simple random decomp data for P factors such that the product of P factors equal a measure for 2 time periods
simulate_decomp_data_fullmat	Simulate grouped data for decomp analysis (T by IDI by factors)

This section should provide a more detailed overview of how to use the package, including the most important functions.

Author(s)

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References

This optional section can contain literature or other references for background information.

See Also

Optional links to other man pages

Examples

```
## Optional simple examples of the most important functions
## Use \dontrun{} around code to be shown but not executed
```

Decomp_Factors

Compute the marginal decomposition effects from given input

Description

Decomp_Factor_Matx() can be used if the input has multiple rows of data to decompose, whereas Decomp_Factor() only takes in vectors as inputs.

Usage

```
Decomp_Factors(vec_x, vec_y, return_dt = TRUE, equality_check = TRUE,
  ...)
```

```
Decomp_Factors_Matx(mat_x, mat_y, return_dt = TRUE, use_cpp = TRUE,
  parallel = 1, equality_check = TRUE, ...)
```

Arguments

<code>vec_x</code>	First input vector (represents t-1)
<code>vec_y</code>	Second input vector (represents t)
<code>return_dt</code>	A boolean on whether to return a data.table or a vector
<code>equality_check</code>	Check whether the decomp values align with inputs. Default: TRUE. Highly recommended to set to TRUE.
<code>...</code>	extra parameters to be passed to <code>all.equal()</code> , for e.g. the tolerance.
<code>mat_x</code>	First input matrix (only for <code>Decomp_Factor_Matx()</code>)
<code>mat_y</code>	Second input matrix (only for <code>Decomp_Factor_Matx()</code>)
<code>use_cpp</code>	A boolean on whether to use the C++ compiled code or not. Default: TRUE
<code>parallel</code>	Number of threads. Default : 1

Value

A data.table or vector of decomposed effects for each factors, which is already multiplied by the change values

Decomp_on_DT	<i>Apply DG Decomposition to data.table columns</i>
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Description

Apply DG Decomposition to data.table columns

Usage

```
Decomp_on_DT(input_data, factor_names, time_col, bycol, use_cpp = TRUE,
  parallel = 1, ...)
```

Arguments

<code>input_data</code>	A data.table with the factors, which must already be sorted
<code>factor_names</code>	A vector of column names for the factor
<code>time_col</code>	A string for the column name
<code>bycol</code>	The 'by' slicer which must make sure that the data is reduced to just 2 rows per group after slicing
<code>use_cpp</code>	A boolean on whether to use the C++ compiled code for the factor for-loop or not (passes to <code>Decomp_Factor_Matx()</code>). Default: TRUE
<code>parallel</code>	Number of threads. Default : 1
<code>...</code>	extra parameters to be passed through <code>Decomp_Factors()</code> to <code>all.equal()</code>

Value

A data.table of the same size as input, but instead with the additive decomposition results (first row will be NA as being the starting period)

Func_Create_Combn	<i>Compute the combination of all positions of the given factor segmented into two pieces</i>
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Description

Compute the combination of all positions of the given factor segmented into two pieces

Usage

```
Func_Create_Combn(Pfac, size1, size2)
```

Arguments

Pfac	Number of factors minus 1
size1	Number of elements to take from vec_x
size2	Number of elements to take from vec_y

Value

A vector of positions made from the unique combinations of size1 and size2

Func_Cross	<i>Compute the combination of all the elements of the given vectors corresponding to the given sizes (using Func_Create_Combn)</i>
------------	--

Description

Compute the combination of all the elements of the given vectors corresponding to the given sizes (using Func_Create_Combn)

Usage

```
Func_Cross(vec_x, vec_y, size1, size2)
```

```
Func_Cross_Matx(vec_x, vec_y, size1, size2)
```

Arguments

vec_x	First input vector
vec_y	Second input vector
size1	Number of elements to take from vec_x
size2	Number of elements to take from vec_y

Value

A vector of column products made from the unique combinations of the *data*

Func_Dem	<i>Compute the denomiator of the inner sums in the DG Decomposition</i>
----------	---

Description

Compute the denomiator of the inner sums in the DG Decomposition

Usage

Func_Dem(P, r)

Arguments

P	Number of factors
r	The summing indicator

Value

A numeric with value of $P * \text{choose}((P-1), (r-1))$

Func_Inner	<i>Compute the fraction for the inner sum in the DG Decomposition where all the params gets passed to Func_Num() and Func_Den()</i>
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Description

Compute the fraction for the inner sum in the DG Decomposition where all the params gets passed to Func_Num() and Func_Den()

Usage

Func_Inner(P, r, vec_x, vec_y)

Func_Inner_Matx(P, r, vec_x, vec_y)

Arguments

P	Number of factors
r	The summing indicator
vec_x	First input vector
vec_y	Second input vector

Value

The fraction of the results of Func_Num() and Func_Den

Func_Inner_Sum	<i>Sum over all inner sums for the DG Decomposition</i>
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Description

Sum over all inner sums for the DG Decomposition

Usage

Func_Inner_Sum(P, vec_x, vec_y)

Func_Inner_Sum_Matx(P, vec_x, vec_y)

Arguments

P	Number of factors
vec_x	First input vector
vec_y	Second input vector
threads	Number of OpenMP threads to use. Default: 1

Value

A numeric value with the full inner sum for the given effect

Func_Num	<i>Compute the numerator of the inner sums in the DG Decomposition</i>
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Description

Compute the numerator of the inner sums in the DG Decomposition

Usage

Func_Num(P, r, vec_x, vec_y)

Func_Num_Matx(P, r, vec_x, vec_y)

Arguments

P	Number of factors
r	The summing indicator
vec_x	First input vector
vec_y	Second input vector

Value

A single numeric from the sums of Func_Cross()

simulate_decomp_data	<i>Simulate simple random decomp data for P factors such that the product of P factors equal a measure for 2 time periods</i>
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Description

Simulate simple random decomp data for P factors such that the product of P factors equal a measure for 2 time periods

Usage

```
simulate_decomp_data(num_fac)
```

Arguments

num_fac	Number of factors to simulate
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Value

A named list with the vector of P factors for 2 time periods, and 2 numeric measures for each time period, which are just the product of each of the two factor vectors

simulate_decomp_data_fullmat	<i>Simulate grouped data for decomp analysis (T by IDI by factors)</i>
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Description

Simulate grouped data for decomp analysis (T by IDI by factors)

Usage

```
simulate_decomp_data_fullmat(T_term, num_factors, id_grps)
```

Arguments

T_term	Number of time periods
num_factors	Number of factors (gets slower for large numbers)
id_grps	Number of groups

Value

A data.table with T_term*id_grps rows and num_factors+1 columns where X_1, ... , X_p are the factors, and Y is the rowwise product of the factors