Package 'proxirr'

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Type Package

Title Alpha, Beta and Gamma Proximity to Irreplaceability

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Description Functions to measure Alpha, Beta and Gamma Proximity to Irreplaceability.
The methods for Alpha and Beta irreplaceability were first described in:
Baisero D., Schuster R. & Plumptre A.J.
Redefining and Mapping Global Irreplaceability.
Conservation Biology 2021;1-11.
<doi:10.1111/cobi.13806>.

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Contents

alpha *Calculate Alpha Irreplaceability*

Description

This function calculates Alpha irreplaceability. Inputs can be single parameter values needed to calculate Alpha, vectors of parameter values to calculate a vector of Alpha values, or a `data.frame` with columns containing parameters needed to calculate a vector of Alpha values.

- **Single Alpha measurement:** If `local`, `global` and `target` are numeric, it calculates and returns Alpha irreplaceability.
- **Vectorized Alpha measurement:** If `local`, `global` and `target` are vectors of the same length, a vector of Alpha irreplaceability values will be calculated and returned.
- **Dataframe Alpha measurement:** If `df` is provided and `local`, `global` and `target` are strings representing field names in `df`, a vector of Alpha irreplaceability values will be caluclated and returned. **Optionally:** If `alpha_col` is also provided, a `data.frame` identical to `df` will be returned with the calculated Alpha values in the `alpha_col` column.

Usage

```
alpha(
  local,
  global,
  target,
  df = NULL,
  alpha_col = NULL,
  triage = FALSE,
  na.allow = NULL,
  overwrite = FALSE
)
```

Arguments

`local`	number, vector or string - The feature's representation at the site, or the name of the column containing the feature's representation at the site.
`global`	number, vector or string - The feature's globally available representation, or the name of the column containing the feature's globally available representation.
`target`	number, vector or string - The feature's target, or the name of the column containing the feature's target.
`df`	data.frame - Optional; an input data.frame.
`alpha_col`	string - The name of the column where to write alpha values. If both df and alpha_col are provided, the output will be the input dataframe with the additional column.

triage	logical - Should features with unachievable targets be ignored? Defaults to FALSE. If FALSE, these species will be always assigned an Alpha irreplaceability of 1 wherever they occur. If TRUE, these species will always be assigned an Alpha irreplaceabiltiy of 0.
na.allow	logical - Allaw NA values in input? If TRUE, NA values in local, global or target walues will result in NA being returned, otherwise an error will be raised. Defaults to FALSE for single Alpha calculations, and to TRUE for calculations over vectors or data.frames.
overwrite	logical - Should alpha_col be overwritten if it already exists?

Value

A number, vector or data.frame

Author(s)

Daniele Baisero, <daniele.baisero@gmail.com>

Examples

```
alpha(1, 100, 45)
alpha(c(1,25,45), c(100,100,100), c(50,50,50))
dtfrm = data.frame(
  loc = c(1,25,45),
  glob = c(100,100,100),
  targ = c(50,50,50)
)
alpha('loc', 'glob', 'targ', df = dtfrm)
```

---

beta *Calculate Beta Irreplaceability*

Description

This function calculates Beta irreplaceability. Inputs can be either a vector of Alpha values, or a data.frame containing all necessary parameters needed to calculate Alpha values on a row-by-row basis.

- **Vector Beta measurement:** If data is a vector of Alpha irreplaceability values, a single Beta value will be calculated and returned.
- **Dataframe Beta measurement:** If data is a data.frame and local, global and target are strings representing field names in data, a vector of Alpha irreplaceability values will be caluclated using these fields, and a Beta irreplaceability value will be calculated on these, and returned.

Usage

```
beta(
  data,
  local = NULL,
  global = NULL,
  target = NULL,
  triage = FALSE,
  na.rm = TRUE
)
```

Arguments

data	vector or data.frame - The input over which to calculate Beta.
local	string - The name of the column containing the feature's representation at the site. Needed if data is a data.frame
global	string - The name of the column containing the feature's total available representation. Needed if data is a data.frame
target	string - The name of the column containing the feature's target. Needed if data is a data.frame
triage	logical - Should features with unachievable targets be ignored? Defaults to FALSE. If FALSE, these species will be always assigned an Alpha irreplaceability of 1 wherever they occur. If TRUE, these species will always be assigned an Alpha irreplaceabiltiy of 0.
na.rm	logical - Should lines with missing values (NA) be ignored? If data is a vector, NA values will be removed when calculating Beta. If data is a data.frame, Alpha values will be calculated using alpha with na.allow set to TRUE, and then Beta calculated ignoring NA values.

Value

A number

Author(s)

Daniele Baisero, <daniele.baisero@gmail.com>

Examples

```
beta(c(0.01, 0.5, 0.5))
dtfrm = data.frame(
  loc = c(1,25,45),
  glob = c(100,100,100),
  targ = c(50,50,50)
)
beta(dtfrm, local = 'loc', global = 'glob', target = 'targ')
```

gamma *Calculate Gamma of Irreplaceability*

Description

This function calculates Gamma of irreplaceability. Inputs can be either a vector of Alpha values, or a `data.frame` containing all necessary parameters needed to calculate Alpha values on a row-by-row basis.

- **Vector Gamma measurement:** If `data` is a vector of Alpha irreplaceability values, a single Gamma value will be calculated and returned.
- **Dataframe Gamma measurement:** If `data` is a `data.frame` and `local`, `global` and `target` are strings representing field names in `data`, a vector of Alpha irreplaceability values will be caluclated using these fields, and a Gamma if irreplaceability value will be calculated on these, and returned.

Usage

```
gamma(
  data,
  local = NULL,
  global = NULL,
  target = NULL,
  triage = FALSE,
  na.rm = TRUE
)
```

Arguments

`data`	vector or data.frame - The input over which to calculate Gamma.
`local`	string - The name of the column containing the feature's representation at the site. Needed if data is a `data.frame`
`global`	string - The name of the column containing the feature's total available representation. Needed if data is a `data.frame`
`target`	string - The name of the column containing the feature's target. Needed if data is a `data.frame`
`triage`	logical - Should features with unachievable targets be ignored? Defaults to FALSE. If FALSE, these species will be always assigned an Alpha irreplaceability of 1 wherever they occur. If TRUE, these species will always be assigned an Alpha irreplaceabiltiy of 0.
`na.rm`	logical - Should lines with missing values (NA) be ignored? If data is a `vector`, NA values will be removed when calculating Gamma. If data is a `data.frame`, Alpha values will be calculated using `alpha` with `na.allow` set to TRUE, and then Gamma calculated ignoring `NA` values.

Value

A number

Author(s)

Daniele Baisero, <daniele.baisero@gmail.com>

Examples

```
gamma(c(0.01, 0.5, 0.5))
dtfrm = data.frame(
  loc = c(1,25,45),
  glob = c(100,100,100),
  targ = c(50,50,50)
)
gamma(dtfrm, local = 'loc', global = 'glob', target = 'targ')
```

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marxan_alphas *Marxan: Alpha irreplaceabilities*

Description

Given a valid Marxan input.dat file, it returns a copy of the PUVSPRNAME file (puvspr.dat), with additional columns containing the feature's global value, target value, and alpha irreplaceability.

Usage

```
marxan_alphas(input, triage = FALSE)
```

Arguments

input	string - The address of the input.dat file.
triage	logical - Should features with unachievable targets be given an irreplaceability of 0? See alpha.

Details

The global value is obtained as the sum of the feature's "amount" column in PUVSPRNAME.

The target value is obtained from the SPECNAME file (spec.dat), either as the proportion of the global value (if the "prop" column is present in SPECNAME), or as the "target" value in SPECNAME (otherwise). This behaviour mirrors Marxan's default behaviour.

Value

A data.frame

Author(s)

Daniele Baisero, <daniele.baisero@gmail.com>

Examples

```
## Not run:
marxan_alphas('/data/marxan/analysis01/input.dat')
marxan_alphas('C:\data\marxan\analysis01\input.dat')

## End(Not run)
```

---

marxan_betas *Marxan: Beta irreplaceabilities*

Description

Given a valid Marxan input.dat file, returns a copy of the PUNAME file (pu.dat), with an additional column containing the planning unit's beta irreplaceability.

Usage

```
marxan_betas(input, triage = FALSE)
```

Arguments

input	string - The address of the input.dat file.
triage	logical - Should features with unachievable targets be given an irreplaceability of 0? See beta.

Value

A data.frame

Author(s)

Daniele Baisero, <daniele.baisero@gmail.com>

Examples

```
## Not run:
marxan_betas('/data/marxan/analysis01/input.dat')
marxan_betas('C:\data\marxan\analysis01\input.dat')

## End(Not run)
```

marxan_gammas *Marxan: Gamma irreplaceabilities*

Description

Given a valid Marxan input.dat file, returns a copy of the PUNAME file (pu.dat), with an additional column containing the planning unit's gamma of irreplaceability.

Usage

```
marxan_gammas(input, triage = FALSE)
```

Arguments

input	string - The address of the input.dat file.
triage	logical - Should features with unachievable targets be given an irreplaceability of 0? See gamma.

Value

A data.frame

Author(s)

Daniele Baisero, <daniele.baisero@gmail.com>

Examples

```
## Not run:
marxan_gammas('/data/marxan/analysis01/input.dat')
marxan_gammas('C:\data\marxan\analysis01\input.dat')

## End(Not run)
```

marxan_run *Marxan: Save Alpha, Beta and Gamma Irreplaceabilities*

Description

Saves the outputs of marxan_alphas, marxan_betas, and marxan_gammas in the marxan output folder.

Usage

```
marxan_run(input, alphas = TRUE, betas = TRUE, gammas = TRUE, triage = FALSE)
```

Arguments

input	string - The address of the input.dat file.
alphas	logical - Should the Alpha Irreplaceability output be saved?
betas	logical - Should the Beta Irreplaceability output be saved?
gammas	logical - Should the Gamma of Irreplaceability output be saved?
triage	logical - Should features with unachievable targets be given an irreplaceability of 0? See alpha, beta and beta.

Details

Three files ('_proxirr_alphas.csv', '_proxirr_betas.csv', '_proxirr_gammas.csv') will be created prefixed with the scenario name indicated in 'input.dat' ('SCENNAME').

Value

TRUE

Author(s)

Daniele Baisero, <daniele.baisero@gmail.com>

Examples

```
## Not run:
marxan_run('/data/marxan/analysis01/input.dat')
marxan_run('C:\data\marxan\analysis01\input.dat')

## End(Not run)
```

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