Package 'gencor'

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Type Package

Title Generate Customized Correlation Matrices

Version 1.0.2

Depends base,

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Description Provides a function that generates a customized correlation matrix based on limit values and proportions for intervals composed by its limits. It can also generate random matrices with low, medium, and high correlations, in which low, medium, and high thresholds are user-defined.

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Encoding UTF-8

Suggests testthat (>= 3.0.0)

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gencor *Generates custom correlation matrices*

Description

This method generates custom correlation matrices based on user-defined limits and/or proportions.

Usage

```
gencor(
  d = 10,
  method = c("random", "low", "medium", "high", "custom"),
  custom_prop = NULL,
  nsim = 1000,
  lim_low = 0.3,
  lim_medium = 0.6,
  custom_lim = NULL,
  signal = c("random", "positive"),
  custom_precision = 0.03,
  custom_nrep = 1000,
  sort_intensity = F,
  random_liminf = 0.01,
  seed = NULL
)
```

Arguments

d	Dimension of the generated matrix. If not informed, d = 10
method	The method of matrix generation. • "random": generates a random matrix with the given dimension; • "low": generates a matrix of values between -lim_low and lim_low; • "medium": generates a matrix of values in the interval [-lim_medium, -lim_low) U (lim_low, lim_medium]; • "high": generates a matrix of values between lim_medium and 1. • "custom": Generates a matrix given the custom limits and proportions of each band defined by the limits.
custom_prop	Vector with custom proportions for every band defined by lim_low and lim_medium or custom_lim. If not defined, the proportions will be equally distributed among the correlation bands.
nsim	Size of vectors used to generate the correlation matrix.
lim_low	The lower limit of generated correlations. Applied in low and medium methods by standard and in custom method if custom_lim are not informed.
lim_medium	The medium limit of generated correlations. Applied in low and medium methods and in custom method if custom_lim are not informed.

`custom_lim` Number or numeric vector with customized limits to generate the correlation matrix.

`signal` Defines if the signals of the correlation matrix must be chosen at random or all must be positive.

- "`positive`": generates a correlation matrix with all correlations positive. Some negative signals may occur for correlations sufficiently near zero.
- "`random`": generates a correlation matrix with random signals

`custom_precision` The precision used in `custom` method. It is the maximum difference between `custom_prop` and the proportions generated by the function

`custom_nrep` The number of iterations in the optimization method used to generate custom correlation matrices.

`sort_intensity` Sorts the correlation matrix by intensity.

`random_liminf` Sets the lower limit of uniform distribution that generates the standard deviations used in random correlation matrix generation. Must be greater than zero due to convergence problems.

`seed` Enables seed definition.

Details

This method generates correlation matrices based on the correlations among normal random variables with mean 0 and specified standard deviation values. These specified standard deviation values make possible the control of the correlation coefficient intensity.

Value

`gencor(...)` returns an object of class "gencor" with a list of the following objects:

- Matrix - The generated correlation matrix.
- Method - The method used in generation
- Proportions - The observed proportions at each level. The levels are given by default or user defined.
- Runtime - Ellapsed simulation time
- Nsim - Number of iterations needed to achieve the desired correlation matrix. 0 if the chosen method was "random".
- Precision - The precision used on the optimization method.
- Dimension - The dimension of the generated correlation matrix.
- Sdev - Vector of standard deviations used in generation process.
- Custom_propp - User defined proportions in custom method. NULL if the chosen method was random.
- custom_lim - User defined correlation limits in custom method. NULL if the chosen method was random.
- Signal - Type of signal generation defined by the user, "random" by default.
- Nrep - Size of simulated data matrix used in correlation matrix generation.
- Generated data - Simulated data used in the generation process.

Examples

```
## Generates a random correlation matrix with dimension 10
gencor()

## Generates a correlation matrix with correlations below 0.3
gencor(15, method = "low", lim_low = 0.3)

## Generates a correlation matrix with correlations between 0.3 and 0.7
gencor(15, method = "medium", lim_low = 0.3, lim_medium = 0.7)

## Generates a correlation matrix with correlations above 0.7
gencor(30, method = "high", lim_medium = 0.75)

## Generates a custom correlation matrix with:
## - 30% of values below 0.2,
## - 30% of values between 0.2 and 0.5,
## - 20% of values between 0.5 and 0.8,
## - 20% of values above 0.8
gencor(20, method = "custom", custom_lim = c(0.2, 0.5, 0.8), custom_prop = c(0.3, 0.3, 0.2, 0.2))
```

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