Package: flexIC (via r-universe)

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Type Package

Title Flexible Rank-Preserving Correlation Engine

Version 0.1.4

Description Implements a fast, flexible method for simulating continuous variables with specified rank correlations using the Iman–Conover transformation (Iman & Conover, 1982 <doi:10.1080/03610918208812265>) and back-ranking. Includes plotting tools and error-diagnostics.

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Imports ggplot2, MASS, stats

Suggests knitr, rmarkdown, mvtnorm, microbenchmark

VignetteBuilder knitr

Repository https://theotherdrwells.r-universe.dev

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flexIC *flexIC: Tunable Iman–Conover Rank-Correlation Imposition*

Description

Applies a rank-based correlation structure to a numeric matrix using a flexible, iterative variant of the Iman–Conover algorithm. The method reorders each column of x based on the rank structure of a multivariate normal draw whose correlation matrix matches target_r. If eps is specified, the algorithm will iteratively draw candidates and select the one with the closest match to the target Spearman structure. The marginal distributions of x are preserved exactly.

Usage

```
flexIC(x, target_r, eps = "none", max_iter = 20)
```

Arguments

x	Numeric matrix or data frame. Columns should be independent prior to transformation.
target_r	Target Spearman correlation matrix to impose. Must be square, symmetric, and positive-definite.
eps	Convergence tolerance (maximum absolute deviation allowed between achieved and target Spearman correlation). If eps = "none", no convergence test is performed and the first draw is used (equivalent to classic Iman–Conover).
max_iter	Maximum number of candidate draws to evaluate when eps is numeric.

Value

A numeric matrix with same dimensions as x, with transformed columns preserving marginal distributions and approximately matching the specified rank correlation structure.

Examples

```
set.seed(1)
x <- cbind(rexp(100), rbinom(100, 5, 0.4))
R_target <- matrix(c(1, 0.6, 0.6, 1), 2)
out <- flexIC(x, R_target, eps = 0.02, max_iter = 50)
cor(out, method = "spearman")
```

ic_exact *One-Shot Iman–Conover Transformation*

Description

Applies the classic Iman–Conover procedure to reorder the columns of a numeric matrix to approximately match a target rank correlation structure, while preserving marginals.

Usage

```
ic_exact(x, target_r)
```

Arguments

x	A numeric matrix or data frame with independent columns (desired marginals).
target_r	A square, positive-definite correlation matrix to impose.

Value

A numeric matrix with the same marginal distributions as x and approximately matching the target Spearman correlation.

Examples

```
set.seed(123)
x <- matrix(rnorm(300), ncol = 3)
R_target <- matrix(c(1, 0.5, 0.3,
                     0.5, 1, 0.4,
                     0.3, 0.4, 1), 3)
out <- ic_exact(x, R_target)
cor(out, method = "spearman")
```

plot_marginals_grid *Facetted histograms of marginals before and after flexIC*

Description

Facetted histograms of marginals before and after flexIC

Arguments

original	Matrix or data frame of the original variables.
flex_out	Either the list returned by flexIC() or the transformed numeric matrix itself.
bins	Number of histogram bins.
after_lab	Facet-strip label for the post-flexIC panel.

Value

A ggplot object (returned invisibly).

Examples

```
set.seed(1)
x  <- matrix(rnorm(300), ncol = 3)
target <- cor(x, method = "spearman")
fo <- flexIC(x, target, eps = 0.02, max_iter = 5)
plot_marginals_grid(x, fo, bins = 30)
```

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