Package 'cocotest'

July 22, 2025

Type Package

Title Dependence Condition Test Using Ranked Correlation Coefficients

Version 1.0.3

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Description A common misconception is that the Hochberg procedure comes up with adequate overall type I error control when test statistics are positively correlated. However, unless the test statistics follow some standard distributions, the Hochberg procedure requires a more stringent positive dependence assumption, beyond mere positive correlation, to ensure valid overall type I error control. To fill this gap, we formulate statistical tests grounded in rank correlation coefficients to validate fulfillment of the positive dependence through stochastic ordering (PDS) condition.
See Gou, J., Wu, K. and Chen, O. Y. (2024). Rank correlation coefficient based tests on positive dependence through stochastic ordering with application in cancer studies, Technical Report.

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Encoding UTF-8

Depends R (>= 4.2.0)

Imports boot (>= 1.1), stats (>= 4.0.0)

RoxygenNote 7.2.3

NeedsCompilation no

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Contents

coco1 *Type 1 Rank correlation coefficient based test on positive dependence through stochastic ordering*

Description

This function evaluates the assumption of positive dependence through stochastic ordering in multiple comparison procedures

Usage

```
coco1(cordx, cordy, alpha = 0.05, Rboot = 100, seed = 1)
```

Arguments

cordx	a numeric vector
cordy	a numeric vector
alpha	a number of significance level
Rboot	a number of bootstrap replicates
seed	a number of the seed of random number generator

Details

R package boot is included for computing nonparametric bootstrap confidence intervals

Value

a vector of three numbers: a lower bound of one-sided confidence interval lower_bound, a test statistic estimation, and an indicator whether the PDS condition holds or not PDS_assumption

Author(s)

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References

Gou, J., Wu, K. and Chen, O. Y. (2024). Rank correlation coefficient based tests on positive dependence through stochastic ordering with application in cancer studies, Technical Report. Gou, J. (2023). On dependence assumption in p-value based multiple test procedures. *Journal of Biopharmaceutical Statistics*, 33(5), 596-610. Gou, J. (2024). A test of the dependence assumptions for the Simes-test-based multiple test procedures. *Statistics in Biopharmaceutical Research*, 16(1), 1-7.

Examples

```
set.seed(123)
cordx <- rnorm(40)
cordy <- rnorm(40)
coco1(cordx, cordy)
```

`coco2` *Type 2 Rank correlation coefficient based test on positive dependence through stochastic ordering*

Description

This function evaluates the assumption of positive dependence through stochastic ordering in multiple comparison procedures

Usage

```
coco2(cordx, cordy, alpha = 0.05, Rboot = 100, seed = 1)
```

Arguments

`cordx`	a numeric vector
`cordy`	a numeric vector
`alpha`	a number of significance level
`Rboot`	a number of bootstrap replicates
`seed`	a number of the seed of random number generator

Details

R package `boot` is included for computing nonparametric bootstrap confidence intervals

Value

a vector of three numbers: a lower bound of one-sided confidence interval `lower_bound`, a test statistic `estimation`, and an indicator whether the PDS condition holds or not `PDS_assumption`

Author(s)

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References

Gou, J., Wu, K. and Chen, O. Y. (2024). Rank correlation coefficient based tests on positive dependence through stochastic ordering with application in cancer studies, Technical Report. Gou, J. (2023). On dependence assumption in p-value based multiple test procedures. *Journal of Biopharmaceutical Statistics*, 33(5), 596-610. Gou, J. (2024). A test of the dependence assumptions for the Simes-test-based multiple test procedures. *Statistics in Biopharmaceutical Research*, 16(1), 1-7.

Examples

```
set.seed(123)
cordx <- rnorm(40)
cordy <- rnorm(40)
coco2(cordx, cordy)
```

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