

Package ‘ManyTests’

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Type Package

Title Multiple Testing Procedures of Cox (2011) and Wong and Cox (2007)

Version 1.2

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Author Christiana Kartsonaki

Maintainer Christiana Kartsonaki <christiana.kartsonaki@gmail.com>

Description Performs the multiple testing procedures of Cox (2011) <[doi:10.5170/CERN-2011-006](https://doi.org/10.5170/CERN-2011-006)> and Wong and Cox (2007) <[doi:10.1080/02664760701240014](https://doi.org/10.1080/02664760701240014)>.

License GPL-2

NeedsCompilation no

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ManyTests-package *Multiple Testing Procedures of Cox (2011) and Wong and Cox (2007)*

Description

Performs the multiple testing procedures of Cox (2011) and Wong and Cox (2007).

Details

Package: ManyTests
Type: Package
Version: 1.1
Date: 2016-10-30
License: GPL-2

Author(s)

Christiana Kartsonaki

Maintainer: Christiana Kartsonaki <christiana.kartsonaki@gmail.com>

References

Cox, D. R. (2011). Discovery: a statistical perspective. *Phystat Conference CERN*. <doi:10.5170/CERN-2011-006>

Cox, D. R. and Wong, M. Y. (2004). A simple procedure for the selection of significant effects. *Journal of the Royal Statistical Society B* **66** (2), 395–400. <doi:10.1111/j.1369-7412.2004.05695.x>

Wong, M. Y. and Cox, D. R. (2007). On the screening of large numbers of significance tests. *Journal of Applied Statistics* **34** (7), 779–783. <doi:10.1080/02664760701240014>

FDR

False Discovery Rate corresponding to t_{θ}

Description

Calculates the FDR which corresponds to a given cut-off t_{θ} according to the procedure of Wong and Cox (2007).

Usage

```
FDR(test_statistics, t_0)
```

Arguments

`test_statistics` A vector of values of test statistics.
`t_0` A cut-off value.

Value

The FDR which corresponds to a given cut-off t_{θ} .

Author(s)

Christiana Kartsonaki

References

- Cox, D. R. and Wong, M. Y. (2004). A simple procedure for the selection of significant effects. *Journal of the Royal Statistical Society B* **66** (2), 395–400. <doi:10.1111/j.1369-7412.2004.05695.x>
- Wong, M. Y. and Cox, D. R. (2007). On the screening of large numbers of significance tests. *Journal of Applied Statistics* **34** (7), 779–783. <doi:10.1080/02664760701240014>

See Also

[t_0](#)

Examples

```
x <- c(rnorm(100, 2, 2), rnorm(50, 0, 2))
FDR(x, t_0(x))
```

local_slope

Calculate and test the local slope of the plot at large values

Description

Calculates the effective slope of the plot at large values and tests the deviation of the largest value from that line (Cox, 2011).

Usage

```
local_slope(p, k)
```

Arguments

p Vector of p -values.
k Number of 'top' k values.

Value

local_slope The estimated local slope of the plot at large values.
test_statistic The value of the test statistic.
Fvalue The upper 5% value of the F distribution with 2 and $2k$ degrees of freedom, which is the distribution of the test statistic under the null hypothesis.
pvalue The p -value of the test.

Author(s)

Christiana Kartsonaki

References

Cox, D. R. (2011). Discovery: a statistical perspective. *Phystat Conference CERN*. <doi:10.5170/CERN-2011-006>

See Also

[plot_pvalues](#)

Examples

```
# generate a vector of p values
p <- runif(100, 0, 1)

local_slope(p, 10)
```

ordered_values

Calculate the expected values of the Renyi decomposition

Description

Calculates the expected values of the Renyi decomposition.

Usage

```
ordered_values(n)
```

Arguments

n Number of values.

Value

A vector of length n.

Author(s)

Christiana Kartsonaki

References

Cox, D. R. (2011). Discovery: a statistical perspective. *Phystat Conference CERN*. <doi:10.5170/CERN-2011-006>

Examples

```
ordered_values(10)
```

plot_pvalues	<i>Plot transformed p-values against the expected values of the Renyi decomposition</i>
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Description

Plots $-\log(p)$ against the expected values of the Renyi decomposition (Cox, 2011).

Usage

```
plot_pvalues(p)
```

Arguments

`p` A vector of p -values.

Author(s)

Christiana Kartsonaki

References

Cox, D. R. (2011). Discovery: a statistical perspective. *Phystat Conference CERN*. <doi:10.5170/CERN-2011-006>

See Also

[local_slope](#)

Examples

```
# generate a vector of p-values
p <- runif(100, 0, 1)

plot_pvalues(p)
```

`t_0`*Cut-off level corresponding to unit Bayes factor*

Description

Calculates the cut-off level corresponding to unit Bayes factor according to the procedure of Wong and Cox (2007).

Usage

```
t_0(test_statistics)
```

Arguments

```
test_statistics
```

A vector of values of test statistics.

Value

Cut-off level corresponding to unit Bayes factor.

Author(s)

Christiana Kartsonaki

References

Cox, D. R. and Wong, M. Y. (2004). A simple procedure for the selection of significant effects. *Journal of the Royal Statistical Society B* **66** (2), 395–400. <doi:10.1111/j.1369-7412.2004.05695.x>

Wong, M. Y. and Cox, D. R. (2007). On the screening of large numbers of significance tests. *Journal of Applied Statistics* **34** (7), 779–783. <doi:10.1080/02664760701240014>

See Also

[FDR](#)

Examples

```
x <- c(rnorm(100, 2, 2), rnorm(50, 0, 2))
t_0(x)
```

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