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

License GPL-2

NeedsCompilation no

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Contents

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)

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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_0`

Description

Calculates the FDR which corresponds to a given cut-off `t_0` 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_0.

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 degress 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` *Plot transformed* p*-values against the expected values of the Renyi decomposition*

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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