Package ‘LFDR.MME’

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Type Package
Title Estimating Local False Discovery Rates Using the Method of Moments
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Description Estimation of the local false discovery rate using the method of moments.
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R topics documented:

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LFDR.MM Performs a Multiple Hypothesis Testing Using the Method of Moments

Description

Based on a given vector of chi-square test statistics, provides estimates of local false discoveries.
Usage

LFDR.MM(x)

Arguments

x  A vector of chi-square test statistics with one degree of freedom.

Details

For $N$ given features (genes, proteins, SNPs, etc.), the function tests the null hypothesis $H_{0i}$, $i = 1, \ldots, N$, indicating that there is no association between feature $i$ and a specific disease, versus its alternative hypothesis $H_{1i}$. For each unassociated feature $i$, it is supposed that the corresponding test statistic $x_i$ follows a central chi-square distribution with one degree of freedom. For each associated feature $i$, it is assumed that the corresponding test statistic $x_i$ follows a non-central chi-square distribution with one degree of freedom and non-centrality parameter $\lambda$. In this packag, association is measured by estimating the local false discovery rate (LFDR), the posterior probability that the null hypothesis $H_{0i}$ given the test statistic $x_i$ is true. This package returns three components as mentioned in the Value section.

Value

Outputs three elements as seen below:

\begin{itemize}
  \item \texttt{pi0.hat} estimate of proportion of unassociated features $\pi_0$.
  \item \texttt{ncp.hat} estimate of the non-centrality parameter $\lambda$ of the chi-square model for associated features.
  \item \texttt{lfdr.hat} estimates of local false discovery rates.
\end{itemize}

Author(s)


References


Examples

\begin{verbatim}
# vector of test statistics for associated features
stat.assoc<- rchisq(n=1000,df=1, ncp = 3)

# vector of test statistics for unassociated features
stat.unassoc<- rchisq(n=9000,df=1, ncp = 0)

# vector of test statistics
stat<- c(stat.assoc,stat.unassoc)
\end{verbatim}
output <- LFDR.MM(x=stat)

# Estimated pi0
output$p0.hat

# Estimated non-centrality parameter
output$ncp.hat

# Estimated LFDRs
output$lfdr.hat
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