Package ‘neariso’

March 11, 2019

Type Package
Title Near-Isotonic Regression
Version 1.0.1
Date 2019-03-11
Author Holger Hoefling, Ryan Tibshirani, Robert Tibshirani
Maintainer Holger Hoefling <hhoeflin@gmail.com>
Description Implements a path algorithm for Near-Isotonic Regression. For more details see the help files.
License GPL-2
Depends R (>= 2.0.0)
NeedsCompilation yes
Repository CRAN
Date/Publication 2019-03-11 13:00:03 UTC

R topics documented:
neariso ................................................................. 1

Index

neariso

Near-Isotonic Regression

Description

These functions are the main interface functions for calculating Nearly-isotonic solutions

Usage

neariso(y, maxBreaks=100, lambda=NULL)
nearisoGetBreakpoints(nearisoPathObj, maxBreaks=100)
nearisoGetSolution(nearisoPathObj, lambda=nearisoGetBreakpoints(nearisoPathObj))
Arguments

- **y**: response variable; numeric
- **lambda**: penalty parameter vector (non-negative) for the difference of coefficients; numeric
- **nearisoPathObj**: Solution object of class `nearisoPath` as returned by `nir`
- **maxBreaks**: maximum number of breakpoints the function should return

Details

`neariso` is the main function to calculate a Nearly-isotonic regression fit and returns an object of class `nearisoPath`. If `lambda=NULL`, then the breakpoints of the linear solution path of beta are chosen, however at most `maxBreaks`. See `nirGetBreakpoints` for what happens if there are more than `maxBreaks` breakpoints.

`nearisoGetSolution` takes an object of class `nearisoPath` and returns an object of the same class, but with the solution calculated for the given value of `lambda`. Advantage in comparison to `neariso` is that it uses the already calculated solution and does not recompute the entire solution path, therefore being faster.

`nearisoGetBreakpoints` returns the lambda values at which the piecewise linear solution paths for beta have a breakpoint. If there are more than `maxBreaks` such breakpoints, only `maxBreaks` representative breakpoints will be returned, including the first and last.

Value

Returns a list with the items

- **solobj**: Object of class `nearisoSolObj` in which the whole solution path is saved in compact form; used as basis to recalculate fits with new values of `lambda` in `nearisoGetSolution`
- **lambda**: Values of `lambda` for which the solution was calculated
- **df**: Number of different values for `beta` in the solution; degrees of freedom; same length as `lambda`
- **beta**: `length(y) x length(lambda)` matrix with the solution

Author(s)

Holger Hoefling

References

Examples

```r
library(neariso)
# generate some artificial data
y <- rnorm(1000) + (1:1000)/3000

### run the algorithm as default; will output solution at 100 breakpoints for lambda
res0 <- neariso(y)

### apply function nir and get solution directly
lambda = 0:10/10
res <- neariso(y, lambda=lambda)

### apply the function and get the solution later
res2 <- neariso(y, lambda=NULL)
res2 <- nearisoGetSolution(res2, lambda=lambda)

### look at the breakpoints
lambdaBreaks <- nearisoGetBreakpoints(res2, maxBreaks=1000)
res3 <- nearisoGetSolution(res2, lambda=lambdaBreaks)
```
Index

Topic **multivariate**
  neariso, 1
Topic **regression**
  neariso, 1

Neariso (neariso), 1
neariso, 1
nearisoGetBreakpoints (neariso), 1
nenarioGetSolution (neariso), 1