

Package ‘isotonic.pen’

May 8, 2026

Type Package

Title Penalized Isotonic Regression in one and two dimensions

Version 1.0

Date 2014-04-04

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Description Given a response y and a one- or two-dimensional predictor, the isotonic regression estimator is calculated with the usual orderings.

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Depends graphics, grDevices, stats, utils, coneProj, Matrix

NeedsCompilation no

Repository CRAN

Date/Publication 2014-04-05 19:08:34

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isotonic.pen-package *Penalized Isotonic Regression in one and two dimensions*

Description

Given a response y and a one- or two-dimensional predictor, the isotonic regression estimator is calculated with the usual orderings. The user can specify a penalty to tame spiking, or a default value can be used.

Details

Package: isotonic.pen
 Type: Package
 Version: 1.0
 Date: 2014-04-04
 License: GPL-2 | GPL-3

Author(s)

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References

Meyer, M.C. (2013) A Simple New Algorithm for Quadratic Programming with Applications in Statistics, *Communications in Statistics*, **42(5)**, 1126-1139.

 iso_pen

Penalized Isotonic Regression in one and two dimensions

Description

Given a response vector y and a predictor matrix $xmat$ with (one or two) columns, the isotonic regression estimator is returned, with the usual (complete or partial) ordering.

Usage

```
iso_pen(y, xmat, wt = 1, pen = TRUE, default = TRUE, lambda = 0, nsim = 0, alpha = 0.05)
```

Arguments

<code>y</code>	The response vector of length n
<code>xmat</code>	Either a one-dimensional predictor vector or an n by 2 matrix of two-dimensional predictor values.
<code>wt</code>	Optional weights – a positive vector of length n .
<code>pen</code>	If <code>pen=FALSE</code> , no penalty is applied to tame spiking. Default is <code>pen=TRUE</code> .
<code>default</code>	If <code>default=FALSE</code> , the user must specify a penalty value.
<code>lambda</code>	Optional penalty. If <code>pen=0</code> , an unpenalized isotonic regression is performed. If not supplied a default penalty is used.
<code>nsim</code>	The number of simulations used in the computation of approximate point-wise confidence intervals. The default is <code>nsim=0</code> , and no confidence intervals are returned.
<code>alpha</code>	The confidence level of the confidence intervals. Default is <code>alpha=.05</code> (i.e., 95 percent confidence intervals)

Details

The least-squares isotonic regression is computed using the coneA function of the R package cone-proj.

Value

fit	The fitted values; i.e., the estimated expected response
sighat	The estimated model standard deviation
upper	The upper points of the point-wise confidence intervals, returned if nsim>0
lower	The lower points of the point-wise confidence intervals, returned if nsim>0

Author(s)

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References

Meyer, M.C. (2013) A Simple New Algorithm for Quadratic Programming with Applications in Statistics, *Communications in Statistics*, **42(5)**, 1126-1139.

Examples

```
### plot the estimated expected lung volume of children given age and height
data(FEV)
x1=FEV[,1]  ## age
x2=FEV[,3]  ## height
y=FEV[,2]
ans=iso_pen(y,cbind(x1,x2))
persp(ans$xg1,ans$xg2,ans$xgmat,th=-40,tick="detailed",xlab="age",ylab="height",zlab="FEV")
```

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