Package ‘SMCP’

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Title Smoothed minimax concave penalization (SMCP) method for genome-wide association studies.
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SMCP

Smoothed minimax concave penalization (SMCP) method for genome-wide association studies.

Description

Fit coefficients paths for a linear model with smoothed minimax concave penalty (SMCP). The model is marginalized so that missing values can be accommodated.

Usage

SMCP(x,y,alpha,lambda,gamma,eps=1e-20,n.iter=100)
sp(x,y,alpha,n.lambda,lambda.min=ifelse(n>p,.001,.05),gamma)


Arguments

- **x**: The design matrix which can include missing values.
- **y**: The response variable.
- **alpha**: The proportion of the tuning parameter for MCP and QA parts. \(\alpha \times \lambda\) is the tuning parameter for MCP. \((1-\alpha) \times \lambda\) is the tuning parameter for QA part.
- **lambda**: The overall tuning parameter.
- **gamma**: The MCP tuning parameter which affects the magnitude of the shrinkage.
- **eps**: Convergence criterion. The iteration will stop if the relative change is smaller than \(\varepsilon\).
- **n.iter**: The maximum number of iterations.
- **n.lambda**: The number of lambdas to be solved for the solution paths.
- **lambda.min**: The minimum lambda to find solution paths.

Details

The function minimizes \(1/(2n)\text{MLS} + \text{SMCP}\), where MLS is the marginalized least squares, SMCP is a smoothed minimax concave penalty.

Value

An object with S3 class "SMCP" containing:
- **beta**: The fitted values of coefficients.
- **w2**: The weights for QA parts computed as adjacent correlation.

An object with S3 class "sp" containing:
- **sp**: The solution paths for the lambda from the maximum to the minimum. The number of columns equals the number of coefficients, and the number of rows is equal to \(\text{n.lambda}\). The first row is the coefficients for the maximum lambda, and the last row is for the minimum lambda.

Author(s)

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References


Examples

```r
x = matrix(rnorm(100*20), 100, 20)
y = rnorm(100)
fit = SMCP(x, y, 0.3, 0.3, 3)
# solution path for this data
s.p = sp(x, y, 0.3, 0.05, 3)
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