Package ‘IterativeHardThresholding’

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Type Package
Title Iterative Hard Thresholding Extensions to Cyclops
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Description Fits large-scale regression models with a penalty that restricts the maximum number of non-zero regression coefficients to a prespecified value. While Chu et al (2020) <doi:10.1093/gigascience/giaa044> describe the basic algorithm, this package uses Cyclops for an efficient implementation.
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Depends R (>= 3.2.2), Cyclops (>= 1.3.0)
Imports ParallelLogger
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createFastIhtPrior  

Create a fastIHT Cyclops prior object

Description

createFastIhtPrior creates a fastIHT Cyclops prior object for use with fitCyclopsModel.

Usage

createFastIhtPrior(
  K,  
  penalty = 0, 
  exclude = c(), 
  forceIntercept = FALSE, 
  fitBestSubset = FALSE, 
  initialRidgeVariance = 10000, 
  tolerance = 1e-08, 
  maxIterations = 10000, 
  threshold = 1e-06
)

Arguments

K                  Maximum # of non-zero covariates
penalty            Specifies the IHT penalty
exclude            A vector of numbers or covariateId names to exclude from prior
forceIntercept    Logical: Force intercept coefficient into regularization
fitBestSubset      Logical: Fit final subset with no regularization
initialRidgeVariance  Numeric: variance used for algorithm initiation
tolerance          Numeric: maximum abs change in coefficient estimates from successive iterations to achieve convergence
maxIterations      Numeric: maximum iterations to achieve convergence
threshold          Numeric: absolute threshold at which to force coefficient to 0

Value

An IHT Cyclops prior object of class inheriting from "cyclopsPrior" for use with fitCyclopsModel.

Examples

nobs = 500; ncovs = 100
prior <- createFastIhtPrior(K = 3, penalty = log(ncovs), initialRidgeVariance = 1/ log(ncovs))
createIhtPrior

Create an IHT Cyclops prior object

Description

createIhtPrior creates an IHT Cyclops prior object for use with fitCyclopsModel.

Usage

createIhtPrior(
  K,
  penalty = "bic",
  exclude = c(),
  forceIntercept = FALSE,
  fitBestSubset = FALSE,
  initialRidgeVariance = 0.1,
  tolerance = 1e-08,
  maxIterations = 10000,
  threshold = 1e-06,
  delta = 0
)

Arguments

K  Maximum # of non-zero covariates
penalty  Specifies the IHT penalty; possible values are 'BIC' or 'AIC' or a numeric value
exclude  A vector of numbers or covariateId names to exclude from prior
forceIntercept  Logical: Force intercept coefficient into regularization
fitBestSubset  Logical: Fit final subset with no regularization
initialRidgeVariance
  Numeric: variance used for algorithm initiation
tolerance  Numeric: maximum abs change in coefficient estimates from successive iterations to achieve convergence
maxIterations  Numeric: maximum iterations to achieve convergence
threshold  Numeric: absolute threshold at which to force coefficient to 0
delta  Numeric: change from 2 in ridge norm dimension

Value

An IHT Cyclops prior object of class inheriting from "cyclopsPrior" for use with fitCyclopsModel.

Examples

prior <- createIhtPrior(K = 10)
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