Package 'GenScreenBayes'

November 21, 2025

Title Tweedie-Based Empirical Bayes Genomic Screening

Version 0.0.1

Description Tools for empirical Bayes genomic screening using Tweedie mixture
models. Provides functions to estimate control and test Tweedie parameters,
compute marginal densities and likelihood ratios, evaluate survival
probabilities for test-control differences, perform posterior inference
for pi0, and obtain gene-level screening probabilities, with plotting
utilities for posterior pi0 summaries.

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Encoding UTF-8

LazyData true

Roxygen list(markdown = TRUE)

RoxygenNote 7.3.3

Depends R (>= 4.1.0)

Imports stringr,
future,
future.apply,
furrr,
mvQuad,
gtools,
purrr,
maxLik,
memoise,
tweedie,
ggplot2,
parallel,
stats,
utils

Suggests testthat (>= 3.0.0),
knitr,
rmarkdown

Config/testthat/edition 3

Contents

GenScreenCalcs.fn *Genomic screening calculations for Tweedie models*

Description

Given control/test matrices and tuning parameters, perform the full Tweedie-based empirical Bayes genomic screening workflow: posterior estimation of control parameters, construction of test parameters, marginal densities, difference survival probabilities, posterior π_0, and screening probabilities.

Usage

```
GenScreenCalcs.fn(GenScrnList, xlim = NULL)
```

Arguments

GenScrnList	A list (typically from [GenScreenMenu.fn](#)) with at least components xC, xT, Tmod, TargDiffs, pi0, zeta, ngridpts, and inits.
xlim	Numeric length-2 vector giving x-axis limits for π_0 plots.

Value

A list with components including:

- TstMargDens – marginal densities and likelihood ratios,
- SurvDiffs – survival probabilities of differences,
- PostDenCDFpi0 – posterior density and CDF of π_0,
- Pgam0 – gene-specific screening probabilities,
- ElapsedTime – elapsed time for the main computation.

GenScreenMenu.fn *Interactive menu to set up GenScreen inputs*

Description

This function interactively collects control/test matrices and hyperparameters for the Tweedie genomic screening workflow and returns a list suitable for [GenScreenCalcs.fn](#).

Usage

```
GenScreenMenu.fn(
  inits_init = c(1.5, 2),
  Tmod_init = c(2, 4, 1),
  TargDiffs_init = c(2, 4, 6, 8),
  ngridpts_init = 10,
  digits_init = 3,
  zeta_init = 5,
  pi0_init = ".0001*0:10000",
  interactive = TRUE
)
```

Arguments

`inits_init`	Initial values for Tweedie mean & dispersion (length-2 numeric).
`Tmod_init`	Length-3 numeric giving Tweedie prior hyperparameters.
`TargDiffs_init`	Numeric vector of target difference values.
`ngridpts_init`	Number of grid points for Gauss–Hermite integration.
`digits_init`	Number of digits for printing output.
`zeta_init`	Beta(zeta, 1) prior parameter for π_0.
`pi0_init`	Expression defining the grid for π_0.
`interactive`	Logical; if TRUE, prompt the user and optionally run `GenScreenCalcs.fn`.

Value

A list containing `xC`, `xT`, `inits`, `Tmod`, `TargDiffs`, `pi0`, `zeta`, `ngridpts`, and `digits`, or the result of `GenScreenCalcs.fn` if called interactively.

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