Package 'metasplines'

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Title Pool Literature-Based and Individual Participant Data Based Spline Estimates

Version 0.1.0

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Depends R (>= 4.2.0)

Description
Pooling estimates reported in meta-analyses (literature-based, LB) and estimates based on individual participant data (IPD) is not straight-forward as the details of the LB nonlinear function estimate are not usually reported. This package pools the nonlinear IPD dose-response estimates based on a natural cubic spline from lm or glm with the pointwise LB estimates and their estimated variances. Details will be presented in Härkänen, Tapanainen, Sares-Jäske, Männistö, Kaartinen and Paalanen (2025) ``Novel pooling method for nonlinear cohort analysis and meta-analysis estimates: Predicting health outcomes based on climate-friendly diets'' (under revision) <https://journals.lww.com/epidem/pages/default.aspx>.

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Encoding UTF-8

RoxygenNote 7.3.2

Imports rlang, dplyr, tidyr, tibble, stringr, meta, optimization

Suggests knitr, rmarkdown, splines2

VignetteBuilder knitr

NeedsCompilation no

Repository CRAN

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Contents

pool_all_splines *Title Pool meta-analysis estimates and estimates from a regression model.*

Description

Title Pool meta-analysis estimates and estimates from a regression model.

Usage

```
pool_all_splines(v, meta.df, glm.res)
```

Arguments

v	Name of the covariate, which is modeled using an nsk spline.
meta.df	Meta-analysis estimates: dataframe with columns variable (covariate name), est (log HR estimate), est.var (estimated variance) and cov.value (covariate values where est and est.var were reported).
glm.res	Regression analysis result object.

Value

List containing pooled estimates of the spline parameters.

Examples

```
# Estimate a linear regression model using an individual participant data (IPD):
library(metasplines)
library(splines2)
res <- lm(
  Petal.Width ~
    Species +
    nsk(Sepal.Length, Boundary.knots = c(4.5, 7.5), knots = c(5, 6, 6.5)),
  data=iris)
# "Literature-based" (LB) estimates:
lb.df <- read.table(text=
"variable,     cov.value,  est,  est.var
Sepal.Length,  4.5,       0,     0
Sepal.Length,  5,         0.15,  0.01
Sepal.Length,  5.5,       0.25,  0.01
Sepal.Length,  6,         0.4,   0.01
Sepal.Length,  6.5,       0.5,   0.01
Sepal.Length,  8,          0.25,  0.04
", sep=",", header=TRUE)
# Output table with the point estimates and the estimated variances:
pool_splines(v="Sepal.Length", meta.df=lb.df, glm.res=res)
```

pool_splines *Title Pool meta-analysis estimates and estimates from a regression model.*

Description

Title Pool meta-analysis estimates and estimates from a regression model.

Usage

```
pool_splines(
  v,
  meta.df,
  glm.res,
  cor.m = NULL,
  x.range = NULL,
  full.output = FALSE
)
```

Arguments

v	Name of the covariate, which is modeled using an nsk spline (see package splines2).
meta.df	Meta-analysis estimates: dataframe with columns est (e.g. log HR estimate), est.var (estimated variance), variable (name of the covariate used in the spline) and cov.value (covariate value at which est and est.var were reported).
glm.res	Regression analysis result object.
cor.m	Assumed correlation matrix. If NULL (default) or NA then use correlation matrix from glm.res.
x.range	If NULL (default), then take the range from meta.df, otherwise give range as a vector with two components.
full.output	If TRUE then output also the log HR values and 95% confidence intervals over a grid of covariate values.

Value

List containing pooled estimates of the spline parameters.

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