Package 'outrigger'

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Type Package

Title Outrigger Regression

Version 1.1.0

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Description Performs outrigger local polynomial regression/ distributional adaptation, using a score-matching spline estimator of the conditional score function.
Details of the method can be found in Young, Shah and Samworth (2026) <doi:10.48550/arXiv.2603.11282>.

License GPL-3

Encoding UTF-8

Imports Rcpp, np, mgcv, RColorBrewer

LinkingTo Rcpp

Suggests testthat (>= 3.0.0)

RoxygenNote 7.2.3

NeedsCompilation yes

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Repository CRAN

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Contents

`outrigger` *Performs outrigger regression at a point x*

Description

Performs outrigger regression at a point x

Usage

```
outrigger(
  formula,
  data,
  xtest,
  degree = 0,
  bandwidth = NULL,
  kernel = "epan",
  lambda = NULL,
  folds = 5,
  scoregranality = 1,
  score_df = 10,
  verbose = TRUE
)
```

Arguments

`formula`	formula (as in e.g. `lm`).
`data`	data frame.
`xtest`	datapoint(s) for local estimation.
`degree`	degree of polynomial.
`bandwidth`	bandwidth parameter. If NULL a rule-of-thumb bandwidth is selected by least-squares cross-validation for the standard local polynomial estimator.
`kernel`	kernel for local polyomial. Default is epanechnikov kernel.
`lambda`	orthogonalisation parameter. By default takes $\lambda = 4(1 + 0.5\log(n))$.
`folds`	number of folds for cross-fitting. Default is 5.
`scoregranality`	the number of bins to split covariate-space $\lvert X - x\rvert \leq \lambda h$ for conditional score estimation.
`score_df`	number of degrees of freedom for score matching splines used for conditional score estimation. Input can be a numeric value (e.g. 10 on larger datasets, 6 on smaller datasets) or "cross-validation" or "cross-validation-quick", in which case score-matching-CV will be performed (may be computationally costly).
`verbose`	suppresses messages of progress. Default is TRUE.

Value

If x is a single point, return a list containing:

`prediction` The outrigger local polynomial estimator $\hat{f}(x)$ at x.

`fitted_vector` For the local linear outrigger estimator, the full fitted vector at x

`standardlocpol_fitted_vector` The fitted vector for the standard local polynomial

`score_plot_metadata` Data used for `score_plotting` to plot the fitted conditional score functions

If x is a vector of points, return a dataset with points x and associated outrigger fitted values.

`score_plots` *Plots the fitted score functions learnt in an* `outrigger` *fit.*

Description

Plots the fitted score functions learnt in an `outrigger` fit.

Usage

```
score_plots(fitted_outrig, plot_together = TRUE)
```

Arguments

`fitted_outrig`	a fitted object from `outrigger`
`plot_together`	a logical denoting whether all score function estimators (across all covariate bins) should be plotted toghether. Default is TRUE.

Value

No return value, called for plotting the estimated score function.

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