Package ‘tdr’

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Description Implementation of target diagrams using 'lattice' and 'ggplot2' graphics. Target diagrams provide a graphical overview of the respective contributions of the unbiased RMSE and MBE to the total RMSE (Jolliff, J. et al., 2009. ``Summary Diagrams for Coupled Hydrodynamic-Ecosystem Model Skill Assessment." Journal of Marine Systems 76: 64–82.)

URL https://codeberg.org/oscarperpinan/tdr/

BugReports https://codeberg.org/oscarperpinan/tdr/issues

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Depends lattice, ggplot2

Imports RColorBrewer, grDevices, stats, utils

Suggests latticeExtra

NeedsCompilation no

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Contents

Stats 2
TargetDiagram 3

Index **6**

`Stats` *Error Statistics*

Description

Error Statistics

Usage

```
tdStats(m, o,
        functions = c("mo", "mm",
                      "sdo", "sdm",
                      "mbe", "mae", "rmse",
                      "nmbe", "cvmbe",
                      "nmae", "cvmae",
                      "nrmse", "cvrmse",
                      "r2", "tStone"))

applyStats(models, o,
           functions = c("mo", "mm",
                         "sdo", "sdm",
                         "mbe", "mae", "rmse",
                         "nmbe", "cvmbe",
                         "nmae", "cvmae",
                         "nrmse", "cvrmse",
                         "r2", "tStone"))
```

Arguments

`m`	Numeric, vector, model values
`models`	Numeric, matrix, model values
`o`	Numeric, vector, observation values
`functions`	Character, name of functions to compute model errors. The package includes definitions for these functions: • Mean: `mo`, `mm` • Standard Deviation: `sdo`, `sdm` • Mean Bias Error: `mbe` • Mean Absolute Error: `mae` • Root Mean Square Error: `rmse` • t of Stone: `tStone` • Coefficient of determination, R^2: `r2` There are also functions that normalize the MBE, MAE and RMSE values. `nmbe`, `nmae`, and `nrmse` use the observation range as factor of normalization, while `cvmbe`, `cvmae`, and `cvrmse`, use the observation average to normalize.

Value

A `data.frame` with a column for each function, and a row for each model.

Author(s)

Oscar Perpiñán Lamigueiro

See Also

`targetDiagram`, `target_diagram`

Examples

```
data(modelEx)

## Analyze one model
tdStats(pvModels$M01, pvObs)

## Analyze a set of models
applyStats(pvModels, pvObs)
```

TargetDiagram *Target Diagrams*

Description

Target diagrams with lattice, `targetDiagram`, and ggplot2, `target_diagram`.

Usage

```
targetDiagram(data, class = "",
              xlab = expression("RMSEc" %.% "sign(" * sigma^"*" * ")"),
              ylab = "MBE",
              auto.key = list(space = "right"),
              default.scales = list(cex = 0.6),
              scales = list(),
              type = "quantile",
              cuts = seq(0.25, 1, 0.25),
              par.settings = tdTheme(),
              ...)

target_diagram(data,
               xlab = expression("RMSEc"%.%"sign("*sigma^"*"*")"),
               ylab = 'MBE',
               type = 'quantile', cuts = seq(0.25, 1, .25),
               ...)

tdTheme(pch = 21:25,
```

```
col.points = brewer.pal(n= 8, 'Dark2'),
fill = brewer.pal(n= 8, 'Pastel2'),
cex = 1.1,
...)
```

Arguments

`data`	A `data.frame` with these columns: nrmse (Root Mean Square Error), nmbe (Mean Bias Error), sdm (Standard Deviation of the model), sdo (Standard Deviation of observations)
`class`	Character, the name of the variable that defines the panels of a trellis graphic.
`xlab`, `ylab`	Character or expression, define the axis labels.
`auto.key`, `default.scales`, `scales`	Legend and scales customization. Read the `xyplot` and `panel.xyplot` help pages for details.
`type`	Character, defines the type of cuts between 'quantile' and 'at'.
`cuts`	Numeric, defines the radius of the RMSE circles. If `type = 'quantile'` it defines the probabilities with values between 0 and 1, and the radius are such that the circles are the corresponding quantile. If `type = 'at'` `cuts` defines the radius of the circles.
`par.settings`	Definition of graphical parameters using `simpleTheme` or its wrapper `tdTheme`
`pch`, `col.points`, `fill`, `cex`	Arguments for `simpleTheme`
`...`	Additional arguments for `xyplot` or `ggplot`

Details

The Target Diagram is derived from the relation between the unbiased RMSE, MBE, and RMSE. In a Cartesian coordinate system, the x-axis represents the unbiased RMSE (variance of the error), and the y-axis represents the MBE. Therefore the distance between any point to the origin is equal to the RMSE. Because the unbiased RMSE is always positive, the left area of the coordinate system is empty with this scheme. With additional information this region may be also used: the unbiased RMSE is multiplied by the sign of the difference between the standard deviations of model and observations.

The resulting diagram provides three different measures: whether the model overestimates or underestimates (positive or negative values of the MBE on the y-axis, respectively), whether the model standard deviation is larger or smaller than the standard deviation of the measurements (positive or negative values on the x-axis, respectively), and the error performance as quantified by the RMSE represented as the distance to the coordinates origin. This tool is particularly powerful when comparing competing models.

`targetDiagram` is built around the `lattice` package, while `target_diagram` is the `ggplot2` version.

`targetDiagram` uses `tdTheme` to define the graphical settings, which is just a wrapper around `simpleTheme`.

Value

`targetDiagram` produces a trellis object. `target_diagram` produces a ggplot object.

Author(s)

Oscar Perpiñán Lamigueiro

References

Jolliff, J. K., Kindle, J. C., Shulman, I., Penta, B., Friedrichs, M. A., Helber, R., & Arnone, R. A. (2009). Summary diagrams for coupled hydrodynamic-ecosystem model skill assessment. Journal of Marine Systems, 76(1), 64-82.

See Also

`xyplot`, `ggplot`, `simpleTheme`, `tdStats`

Examples

```
data(modelEx)

## Compute statistics
errModel <- applyStats(pvModels, pvObs)

## Display results
## Default settings use type = 'quantile'
targetDiagram(errModel, groups = model)

target_diagram(errModel, fill = 'model')

## whose breaks can be defined with 'cuts'
targetDiagram(errModel, groups = model,
              type = 'quantile',
              cuts = seq(0, 1, .1))

target_diagram(errModel, fill = 'model',
              type = 'quantile',
              cuts = seq(0, 1, .1))

## Alternatively, with type = 'at'
## one can define manually the breaks
targetDiagram(errModel, groups = model,
              type = 'at',
              cuts = seq(0, .1, .02))

target_diagram(errModel, fill = 'model',
              type = 'at',
              cuts = seq(0, .1, .02))
```

Index

applyStats *(Stats)*, 2

ggplot, *4, 5*

panel.xyplot, *4*
pvModels *(Stats)*, 2
pvObs *(Stats)*, 2

simpleTheme, *4, 5*
Stats, 2

target_diagram, *3*
target_diagram *(TargetDiagram)*, 3
TargetDiagram, 3
targetDiagram, *3*
targetDiagram *(TargetDiagram)*, 3
tdStats, *5*
tdStats *(Stats)*, 2
tdTheme *(TargetDiagram)*, 3

xyplot, *4, 5*