Package 'ReliaPlotR'

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Type Package

Title Interactive Reliability Probability Plots

Version 0.4

Description
Build interactive Reliability Probability Plots with 'plotly' by Carson Sievert (2020) <https://plotly-r.com>, an interactive web-based graphing library.

URL https://paulgovan.github.io/ReliaPlotR/, https://github.com/paulgovan/ReliaPlotR

BugReports https://github.com/paulgovan/ReliaPlotR/issues

License Apache License

Imports plotly, ReliaGrowR, WeibullR

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`plotly_contour` *Interactive Contour Plot*

Description

This function creates an interactive contour plot for one or more ‘wblr‘ objects, each assumed to have confidence contours generated via ‘method.conf = ’lrb’‘. The function overlays all contours in a single plot and displays their respective MLE point estimates.

Usage

```
plotly_contour(
  wblr_obj,
  main = "Contour Plot",
  xlab = "Eta",
  ylab = "Beta",
  showGrid = TRUE,
  cols = NULL,
  gridCol = "lightgray",
  signif = 3
)
```

Arguments

`wblr_obj`	A single ‘wblr‘ object or a list of ‘wblr‘ objects. Each object must have contours generated using ‘method.conf = ’lrb’‘.
`main`	Main title for the plot.
`xlab`	X-axis label (typically Eta or Sigmalog).
`ylab`	Y-axis label (typically Beta or Mulog).
`showGrid`	Logical; whether to show grid lines (default TRUE).
`cols`	Optional vector of colors for each contour/estimate pair. If not provided, colors are chosen from a default palette.
`gridCol`	Color of the grid lines (default ’lightgray’).
`signif`	Number of significant digits to display for estimates and contour coordinates. Defaults to 3.

Value

A ‘plotly‘ object representing the interactive contour plot.

Examples

```
library(WeibullR)
library(ReliaPlotR)

failures1 <- c(30, 49, 82, 90, 96)
failures2 <- c(20, 40, 60, 80, 100)
obj1 <- wblr.conf(wblr.fit(wblr(failures1), method.fit = "mle"), method.conf = "lrb")
obj2 <- wblr.conf(wblr.fit(wblr(failures2), method.fit = "mle"), method.conf = "lrb")
plotly_contour(list(obj1, obj2), main = "Overlayed Contours")
```

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plotly_duane *Interactive Duane Plot.*

Description

This function creates an interactive Duane plot for a duane object. The plot includes options to customize the appearance, such as colors and grid visibility.

Usage

```
plotly_duane(
  duane_obj,
  showGrid = TRUE,
  main = "Duane Plot",
  xlab = "Cumulative Time",
  ylab = "Cumulative MTBF",
  pointCol = "black",
  fitCol = "black",
  gridCol = "lightgray"
)
```

Arguments

duane_obj	An object of class 'duane'. This object is created using the 'duane' function from the ReliaGrowR package.
showGrid	Show grid (TRUE) or hide grid (FALSE). Default is TRUE.
main	Main title. Default is "Duane Plot".
xlab	X-axis label. Default is "Cumulative Time".
ylab	Y-axis label. Default is "Cumulative MTBF".
pointCol	Color of the point values. Default is "black".
fitCol	Color of the model fit. Default is "black".
gridCol	Color of the grid. Default is "lightgray".

Value

The function returns no value. It generates an interactive Duane plot.

Examples

```
library(ReliaGrowR)
times <- c(100, 200, 300, 400, 500)
failures <- c(1, 2, 1, 3, 2)
fit <- duane(times, failures)
plotly_duane(fit)
```

---

plotly_rga *Interactive Reliability Growth Plot.*

Description

The function creates an interactive reliability growth plot for an 'rga' object. The plot includes cumulative failures over time, the model fit, and optional confidence bounds. Vertical lines indicate change points if breakpoints are specified in the rga object.

Usage

```
plotly_rga(
  rga_obj,
  showConf = TRUE,
  showGrid = TRUE,
  main = "Reliability Growth Plot",
  xlab = "Cumulative Time",
  ylab = "Cumulative Failures",
  pointCol = "black",
  fitCol = "black",
  confCol = "black",
  gridCol = "lightgray",
  breakCol = "black"
)
```

Arguments

rga_obj	An object of class 'rga'. This object is created using the 'rga()' function from the 'ReliaGrowR' package.
showConf	Show the confidence bounds (TRUE) or not (FALSE).
showGrid	Show grid (TRUE) or hide grid (FALSE).
main	Main title.
xlab	X-axis label.
ylab	Y-axis label.

pointCol	Color of the point values.
fitCol	Color of the model fit.
confCol	Color of the confidence bounds.
gridCol	Color of the grid.
breakCol	Color of the breakpoints.

Value

The function returns no value. It generates an interactive plotly plot.

Examples

```
library(ReliaGrowR)
times <- c(100, 200, 300, 400, 500)
failures <- c(1, 2, 1, 3, 2)
rga <- rga(times, failures)
plotly_rga(rga)

times <- c(100, 200, 300, 400, 500, 600, 700, 800, 900, 1000)
failures <- c(1, 2, 1, 1, 1, 2, 3, 1, 2, 4)
breakpoints <- 400
rga2 <- rga(times, failures, model_type = "Piecewise NHPP", breaks = breakpoints)
plotly_rga(rga2, fitCol = "blue", confCol = "blue", breakCol = "red")
```

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plotly_wblr *Interactive Probability Plot.*

Description

This function creates an interactive probability plot for a wblr object. It can include confidence bounds, suspension data, and a results table.

Usage

```
plotly_wblr(
  wblr_obj,
  susp = NULL,
  showConf = TRUE,
  showSusp = TRUE,
  showRes = TRUE,
  showGrid = TRUE,
  main = "Probability Plot",
  xlab = "Time to Failure",
  ylab = "Probability",
  probCol = "black",
  fitCol = "black",
  confCol = "black",
```

```
  intCol = "black",
  gridCol = "lightgray",
  signif = 3
)
```

Arguments

wblr_obj	An object of class 'wblr'. This is a required argument.
susp	An optional numeric vector of suspension data. Default is NULL.
showConf	Show the confidence bounds (TRUE) or not (FALSE). Default is TRUE if confidence bounds are available in the wblr object.
showSusp	Show the suspensions plot (TRUE) or not (FALSE). Default is TRUE if susp is provided.
showRes	Show the results table (TRUE) or not (FALSE). Default is TRUE.
showGrid	Show grid (TRUE) or hide grid (FALSE). Default is TRUE.
main	Main title. Default is 'Probability Plot'.
xlab	X-axis label. Default is 'Time to Failure'.
ylab	Y-axis label. Default is 'Probability'.
probCol	Color of the probability values. Default is 'black'.
fitCol	Color of the model fit. Default is 'black'.
confCol	Color of the confidence bounds. Default is 'black'.
intCol	Color of the intervals for interval censored models. Default is 'black'.
gridCol	Color of the grid. Default is 'lightgray'.
signif	Significant digits of results. Default is 3. Must be a positive integer.

Value

The function returns no value. It creates an interactive probability plot.

Examples

```
library(WeibullR)
library(ReliaPlotR)
failures <- c(30, 49, 82, 90, 96)
obj <- wblr.conf(wblr.fit(wblr(failures)))
plotly_wblr(obj)

suspensions <- c(100, 45, 10)
obj <- wblr.conf(wblr.fit(wblr(failures, suspensions)))
plotly_wblr(obj, suspensions,
  fitCol = "blue",
  confCol = "blue"
)
inspection_data <- data.frame(
  left = c(0, 6.12, 19.92, 29.64, 35.4, 39.72, 45.32, 52.32),
  right = c(6.12, 19.92, 29.64, 35.4, 39.72, 45.32, 52.32, 63.48),
```

```
  qty = c(5, 16, 12, 18, 18, 2, 6, 17)
)
suspensions <- data.frame(time = 63.48, event = 0, qty = 73)
obj <- wblr(suspensions, interval = inspection_data)
obj <- wblr.fit(obj, method.fit = "mle")
obj <- wblr.conf(obj, method.conf = "fm", lty = 2)
suspensions <- as.vector(suspensions$time)
plotly_wblr(obj,
  susp = suspensions, fitCol = "red", confCol = "red", intCol = "blue",
  main = "Parts Cracking Inspection Interval Analysis",
  ylab = "Cumulative % Cracked", xlab = "Inspection Time"
)
failures <- c(25, 30, 42, 49, 55, 67, 73, 82, 90, 96, 101, 110, 120, 132, 145)
fit <- wblr.conf(wblr.fit(wblr(failures), dist = "weibull3p"))
plotly_wblr(fit, fitCol = "darkgreen", confCol = "darkgreen")
```

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