Package 'ReliaGrowR'

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Title Reliability Growth Analysis

Version 0.1.1

Description Modeling and plotting functions for Reliability Growth Analysis (RGA). Models include the Duane (1962) <doi:10.1109/TA.1964.4319640>, Non-Homogeneous Poisson Process (NHPP) by Crow (1975) <https://apps.dtic.mil/sti/citations/ADA020296>, Piecewise Weibull NHPP by Guo et al. (2010) <doi:10.1109/RAMS.2010.5448029>, and Piecewise Weibull NHPP with Change Point Detection based on the 'segmented' package by Muggeo (2024) <https://cran.r-project.org/package=segmented>.

Imports stats, graphics, segmented

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Encoding UTF-8

RoxygenNote 7.3.2

Suggests knitr, rmarkdown, spelling, testthat (>= 3.0.0)

Language en-US

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

Config/testthat/edition 3

VignetteBuilder knitr

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

NeedsCompilation no

Author Paul Govan [aut, cre, cph] (<https://orcid.org/0000-0002-1821-8492>)

Maintainer Paul Govan <paul.govan2@gmail.com>

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Contents

`duane_plot` *Plotting Function for Duane Analysis.*

Description

Plotting Function for Duane Analysis.

Usage

```
duane_plot(
  times,
  failures,
  point_col = "black",
  line_col = "black",
  xlab = "Cumulative Time",
  ylab = "Cumulative MTBF",
  main = "Duane Plot with Cumulative MTBF"
)
```

Arguments

`times`	A vector of cumulative times at which failures occurred.
`failures`	A vector of the number of failures at each corresponding time in times.
`point_col`	Color for the data points (default: "black").
`line_col`	Color for the fitted line (default: "black").
`xlab`	Label for the x-axis (default: "Cumulative Time").
`ylab`	Label for the y-axis (default: "Cumulative MTBF").
`main`	Title for the plot (default: "Duane Plot with Cumulative MTBF").

Value

The function returns a list of the fitted linear model, Cumulative Time, Cumulative MTBF.

Examples

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

plot_rga *Plotting Function for Reliability Growth Analysis*

Description

Plotting Function for Reliability Growth Analysis

Usage

```
plot_rga(
  rga_obj,
  point_col = "black",
  line_col = "black",
  xlab = "Cumulative Time",
  ylab = "Cumulative Failures",
  main = "Reliability Growth Analysis"
)
```

Arguments

rga_obj	An object of class rga, which contains the results from the RGA model.
point_col	Color for the data points (default: "black").
line_col	Color for the fitted line (default: "black").
xlab	Label for the x-axis (default: "Cumulative Time").
ylab	Label for the y-axis (default: "Cumulative Failures").
main	Title for the plot (default: "Reliability Growth Analysis").

Value

The function does not return a value.

Examples

```
times <- c(100, 200, 300, 400, 500)
failures <- c(1, 2, 1, 3, 2)
result <- rga(times, failures)
plot_rga(result)
```

rga *Reliability Growth Analysis.*

Description

Reliability Growth Analysis.

Usage

```
rga(
  times,
  failures,
  model_type = "Crow-AMSAA",
  breakpoints = NULL,
  conf_level = 0.95
)
```

Arguments

times	A vector of cumulative times at which failures occurred.
failures	A vector of the number of failures at each corresponding time in times.
model_type	The model type. Either Crow-AMSAA (default) or Piecewise Weibull NHPP with change point detection.
breakpoints	An optional vector of breakpoints for the Piecewise Weibull NHPP model.
conf_level	The desired confidence level, which defaults to 95%.

Value

The function returns an object of class rga that contains the results for the model.

Examples

```
times <- c(100, 200, 300, 400, 500)
failures <- c(1, 2, 1, 3, 2)
result <- rga(times, failures)
print(result)
```

`weibull_to_rga` *Convert Weibull Data to Reliability Growth Data*

Description

Convert Weibull Data to Reliability Growth Data

Usage

```
weibull_to_rga(failures, suspensions = NULL)
```

Arguments

`failures`	A vector of failure times.
`suspensions`	A vector of suspension (censoring) times.

Value

A data frame with times and failure counts suitable for reliability growth analysis.

Examples

```
failures <- c(100, 200, 200, 400)
suspensions <- c(250, 350, 450)
result <- weibull_to_rga(failures, suspensions)
print(result)
```

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