

# Package ‘YPInterimTesting’

November 17, 2017

**Type** Package

**Title** Interim Monitoring Using Adaptively Weighted Log-Rank Test in Clinical Trials

**Version** 0.1.0

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**Description** Provide monitoring boundaries for interim testing using the adaptively weighted log-rank test developed by Yang and Prentice (2010 <doi:10.1111/j.1541-0420.2009.01243.x>). The package use a re-sampling method to obtain stopping boundaries in sequential designs. The output consists of stopping boundaries at the interim looks along with nominal p-values defined as the probability of the test exceeding the specific observed value or critical value, regardless of the test behavior at other looks. The asymptotic distribution of the test statistics of the adaptively weighted log-rank test at the interim looks is examined in Yang (2017, pre-print).

**License** GPL (>= 3)

**Encoding** UTF-8

**LazyData** true

**RoxygenNote** 6.0.1

**Imports** Rcpp

**LinkingTo** Rcpp

**NeedsCompilation** yes

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YPInterimTesting-package

*Interim Monitoring Using Adaptively Weighted Log-rank Test in Clinical Trials*

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## Description

This package provides monitoring boundary for interim testing using the adaptively weighted log-rank test developed by Yang and Prentice (2010). A re-sampling method is used instead of the originally proposed method. It is shown in Yang (2017) that the adaptively weighted log-rank test is asymptotically fully efficient when the limiting censoring distributions in two groups are equal. For a given spending function, the main function of the package `ypinterim` provides stopping boundaries at the interim looks, along with nominal p-values.

The object being returned by the function `ypinterim` can be formatted to a table using the function `summary`.

## Details

Package: YPInterimTesting  
Type: Package  
Version: 1.0.0  
Date: 2017-10-31  
License: GPL (>= 3)

## Author(s)

Daewoo Pak and Song Yang

## References

Yang, S. and Prentice, R. (2010), Improved Logrank-Type Tests for Survival Data Using Adaptive Weights. *Biometrics*, 66: 30–38.

Yang, S. Interim monitoring using the adaptively weighted log-rank test in clinical trials for survival outcomes. 2017. Pre-print.

## See Also

`ypinterim`

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virtual	<i>virtual Data Set for the example</i>
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**Description**

This virtual data set is created to show how to utilize the package.

**Usage**

```
data(virtual_data)
```

**Format**

The data has the following information:

`time` the numeric matrix of virtual event times for all interim looks.

`event` the numeric matrix of right-censoring indicators corresponding to `time` (`event = 1`, censored = 0).

`group` the numeric vector of the group indicator (`treatment = 1`, control = 0).

**See Also**

[ypinterim](#)

**Examples**

```
library(YPInterimTesting)
data(virtual_data)
time <- virtual$time
colnames(time) # Check the order of the column names.
head(time)
```

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ypinterim	<i>The main function of the package performing the adaptively weighted log-rank test for interim monitoring</i>
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**Description**

Provides stopping boundaries and nominal p-values at the interim looks using the adaptively weighted log-rank test developed by Yang and Prentice (2010).

**Usage**

```
## Default S3 method:
ypinterim(time, event, group, spenfun, critvalue = NULL,
  repnum = 10000, bound = 50, ...)
```

**Arguments**

...	for S4 method only.
time	the numeric matrix of event times for all interim looks. The columns of the matrix represent interim looks in date order.
event	the numeric matrix of right-censoring indicators corresponding to time (event = 1, censored = 0). The dimension of the matrix should be equivalent to that of time.
group	the numeric vector of the group indicator (treatment = 1, control = 0).
spenfun	the numeric vector of the values for the spending function $\alpha(t)$ . Must be user-specified.
critvalue	the vector of the critical values for the prior interim look. If it is not supplied, the value at each interim look will be obtained using the re-sampling method. The length of vector should be at least one less than the number of columns of time.
repnum	the number of replications for a normal resampling approximation. The default value is 10000.
bound	the boundary (-bound, bound) for estimating the parameters relevant to a short-term and a long-term hazard ratio in Yang and Prentice model (Yang and Prentice, 2005). These parameters are $\beta_1$ and $\beta_2$ in their notations. The default boundary is $(-50, 50)$ .

**Details**

The object being returned by the function `ypinterim` can be formatted to a table using the function `summary`.

**References**

Yang, S. and Prentice, R. (2010), Improved Logrank-Type Tests for Survival Data Using Adaptive Weights. *Biometrics*, 66: 30–38.

Yang, Song, and Ross Prentice. "Semiparametric analysis of short-term and long-term hazard ratios with two-sample survival data." *Biometrika* 92.1 (2005): 1-17.

**Examples**

```
library(YPInterimTesting)
data(virtual_data)
spenfun <- c(1.3E-5, 4.4E-4, 0.003, 0.008)

result <- ypinterim(time=virtual$time, event=virtual$event, group=virtual$group, spenfun=spenfun)
result
summary(result)
```

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YPIterimTesting-internal

*Internal Functions for Interim Monitoring Using Adaptively Weighted  
Log-rank Test in Clinical Trials*

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**Description**

Internal functions for the YPIterimTesting package.

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\*Topic **Survival analysis, Clinical trials, Interim analysis, Yang and Prentice model**

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