# Package: ahMLE (via r-universe)

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**Type** Package

**Title** Methods for the Additive Hazard Model

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**Description** Methods for fitting additive hazards model. Perform the maximum likelihood method as well as the traditional Aalen's method for estimating the additive hazards model. For details see Chengyuan Lu(2021) <arXiv:2004.06156>.

**License** GPL (>= 2)

**Depends** R (>= 3.1.0), survival

**Imports** Rcpp (>= 1.0.1), Matrix, invGauss

**LinkingTo** Rcpp, RcppArmadillo, Matrix

**SystemRequirements** C++11

**Encoding** UTF-8

**Suggests** knitr, rmarkdown

**VignetteBuilder** knitr

**RoxygenNote** 7.1.0

**NeedsCompilation** yes

**Repository** CRAN

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## Contents

ah *ah*

## Description

This function offers the methods to fit the additive hazards model, including Aalen's method and Maximum likelihood method.

## Usage

```
ah(
  formula = formula(data),
  data = sys.parent(),
  matrix_domain = NULL,
  progbar = FALSE,
  method = "ml_opt",
  scale = TRUE,
  startedge = NULL
)
```

## Arguments

| | |
|---|---|
| formula | A formula, the dependent variable must be of type Surv in the survival package.. |
| data | A data frame with the covariates mentioned in the formula stored. |
| matrix_domain | A matrix describing the domain to find the maximum likelihood. The default constraint matrix guarantees the hazards to be positive for all possible covariates. |
| progbar | A logical value, shows the progress bar if it is TRUE, hide the progress bar if FALSE, default value is FALSE. |
| method | A string with values "aalen", "ml_opt", "ml_enum", "ml_asc" and "ml_desc". Default value is "ml_opt". "aalen" represents the Aalen's method. "ml_opt" is the default method with respect to the default constraint matrix. "ml_enum","ml_asc" and "ml_desc" represents to the naive method, ascending method and descending method. Please check the referee for details. |
| scale | A logical value, scales the input data in the interval [0,1] if it is TRUE. Default value is TRUE. |
| startedge | a vector which satisfies the domain condition. Only used for the ascending method. |

## Value

A data frame, containing the coefficients (beta) at each time point and the cumulative beta at each time point.

## References

Chengyuan Lu, Jelle Goeman, Hein Putter Maximum likelihood estimation in the additive hazards model arXiv:2004.06156

## Examples

```
X1 = rnorm(100); X2 = rnorm(100)
Survival_Time = rep(0,100)
U = runif(100,min =0, max =1)
for (i in 1:100){Survival_Time[i] = sqrt((-2*log(U[i]))/(0.3*X1[i] + 0.7*X2[i]))}
tcens = runif(100, 2.5, 7.5)
time =  pmin(Survival_Time, tcens)
event = as.numeric(Survival_Time<=tcens)
Data = data.frame(time = time, X1 = X1, X2 = X2, event = event)

Result = ah(Surv(time = time, event = event)~ X1 + X2, Data)
```

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Calc_Cbeta *Calc_Cbeta*

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## Description

Computing cumulative beta from beta (the magnitude of the jumps of the coefficient function)

## Usage

```
Calc_Cbeta(beta)
```

## Arguments

| | |
|---|---|
| beta | The dataframe storing the magnitude of the jumps beta of the coefficients of the additive hazard. The first column should be the survival time. |

## Value

Return the cumulative beta by the giving beta.

## Examples

```
beta  = data.frame(time = c(1,2,3,4), beta = c(5,6,7,8))
cbeta = Calc_Cbeta(beta)
```

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