

Package ‘CoxLikelihood’

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Type Package

Title Robust Likelihood Ratio Test and Confidence Intervals for the Cox Model

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Description Calculate the likelihood ratio test p-value and likelihood confidence intervals for misspecified Cox models, as described in Shao and Guo (2025) <[doi:10.48550/arXiv.2508.11851](https://doi.org/10.48550/arXiv.2508.11851)>.

Imports survival

License GPL-3

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CoxLikelihood *Robust Likelihood Ratio Test and Confidence Intervals for the Cox Model*

Description

Calculate the (robust) likelihood ratio test p-values and confidence intervals for the Cox model.

Usage

```
CoxLikelihood(time, event, X, robust = TRUE, weights = NULL, alpha = 0.05)
```

Arguments

time	time of the event or censoring.
event	a binary variable indicating whether the record is an event or is censored. 1 is for event, 0 is for censoring.
X	a numeric matrix specifying the dependent variables of the Cox model.
robust	specifying whether the robust p-values and confidence intervals will be calculated. Default is TRUE.
weights	weights of each observation. The default is one for each observation.
alpha	1-alpha is the confidence interval (or the target coverage) of the output confidence interval.

Details

The robust likelihood ratio test p-value is based on a scaled chi-square distribution. The robust likelihood confidence interval is generated by inverting the robust likelihood ratio test. See Shao and Guo (2026) for details.

Value

A data frame which gives the hazard ratio estimate, the robust likelihood ratio test p-values, and the robust likelihood confidence intervals.

Author(s)

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References

Shao, Yongwu, and Xu Guo. "Likelihood confidence intervals for misspecified Cox models." arXiv preprint arXiv:2508.11851 (2025).

Examples

```
##Create example data;
set.seed(2026);
nSubj = 100;
event = rep(1, nSubj);
X = matrix(rnorm(nSubj * 3), nSubj, 3);
time = exp(-X[,2]/2 - X[,1]^2 + X[,3]);
X = X[,-3];

## Get the robust and regular likelihood confidence intervals
CoxLikelihood(time, event, X, robust = FALSE);
CoxLikelihood(time, event, X, robust = TRUE);
```

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