Package 'KONPsurv'

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Type Package

Title KONP Tests: Powerful K-Sample Tests for Right-Censored Data

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Description The K-sample omnibus non-proportional hazards (KONP) tests are powerful non-parametric tests for comparing K (>=2) hazard functions based on right-censored data (Gorfine, Schlesinger and Hsu, 2020, <doi:10.1177/0962280220907355>). These tests are consistent against any differences between the hazard functions of the groups. The KONP tests are often more powerful than other existing tests, especially under non-proportional hazard functions.

License GPL (>= 2)

Imports survival,Rcpp (>= 0.12.16)

LinkingTo Rcpp

RoxygenNote 7.0.0

Encoding UTF-8

Suggests testthat

NeedsCompilation yes

Repository CRAN

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Contents

KONPsurv-package *KONP Tests for Testing the Equality of K Distributions for Right-Censored Data*

Description

An implementation of the K-sample omnibus non-proportional hazrds (KONP) tests.

The KONP tests are powerful non-parametric tests for comparing K (>=2) hazard functions based on right-censored data. These tests are consistent against any differences between the hazard functions of the groups. The KONP tests are often more powerful than other existing tests, especially under non-proportional hazard functions.

Details

The package contains one function:

`konp_test`: non-parametric tests for equality of K distributions using right-censored data.

Author(s)

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References

Gorfine, M., Schlesinger, M., & Hsu, L. (2020). K-sample omnibus non-proportional hazards tests based on right-censored data. Statistical Methods in Medical Research, 29(10), 2830–2850. doi: 10.1177/0962280220907355

Examples

```
# gastric cancer data
data(gastric)

konp_test(gastric$time, gastric$status, gastric$group, n_perm=10^3)
```

carcinoma *Urothelial carcinoma.*

Description

Survival data from a trial comparing chemotherapy versus atezolizumab in the treatment of Urothelial carcinoma.

Usage

```
data(carcinoma)
```

Format

A data frame with 625 observations (316 in the atezolizumab group and 309 chemotherapy group) with the following 3 columns:

time the observed follow-up times in days.

status the event indicators, 0=right censored, 1= event.

group the group labels, 1 = atezolizumab, 2 = chemotherapy.

References

Powles T, Dura?n I, van der Heijden MS, et al. Atezolizumab versus chemotherapy in patients with platinum-treated locally advanced or metastatic urothelial carcinoma (IMvigor211): a multicentre, open-label, phase 3 randomised controlled trial. Lancet 2018; 391: 748-757.

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gastric *Gastric Cancer Data.*

Description

Survival data from a trial comparing chemotherapy versus combined chemotherapy plus radiotherapy in the treatment of gastric cancer.

Usage

```
data(gastric)
```

Format

A data frame with 90 observations (45 in each treatment group) with the following 3 columns:

time the observed follow-up times in days.

status the event indicators, 0=right censored, 1= event.

group the group labels, 1 = chemotherapy, 2 = chemotherapy plus radiotherapy.

Source

Stablein, D. M. and Koutrouvelis, I. A. (1985) A two-sample test sensitive to crossing hazards in uncensored and singly censored data. Biometrics 41, 643–652. (Page 649).

References

Gastrointestinal Tumor Study Group: Schein, P. D., Stablein, D. M., Bruckner, H. W., Douglass, H. O., Mayer, R., et al. (1982). A comparison of combination chemotherapy and combined modality therapy for locally advanced gastricarcinoma. Cancer 49, 1771-1777.

konp_test *KONP tests are K-sample Omnibus Non-Proportional hazards tests for right-censored data.*

Description

KONP tests are K-sample Omnibus Non-Proportional hazards tests for right-censored data.

Usage

```
konp_test(time, status, group, n_perm, n_impu = 1)
```

Arguments

time	A vector of the observed follow-up times.
status	A vector of event indicators, 0=right censored, 1= event at time.
group	A vector denoting the group labels, must contain at least two different values.
n_perm	The number of permutations.
n_impu	The number of imputations, for each imputation n_perm permutations will be executed.

Details

The KONP tests are powerful non-parametric tests for comparing K (>=2) hazard functions based on right-censored data. These tests are consistent against any differences between the hazard functions of the groups. The KONP tests are often more powerful than other existing tests, especially under non-proportional hazard functions.

Value

Three test statistics and their respective p-values are returned:

pv_chisq - returns the p-value based on the KONP test chi-square statistic.
pv_lr - returns the p-value based on the KONP test likelihood ratio statistic.
pv_cauchy - returns the p-value based on the KONP-based Cauchy-combination test statistic.
chisq_test_stat - returns the KONP test chi-squared test statistic.
lr_test_stat - returns the KONP test likelihood-ratio test statistic.
cauchy_test_stat - returns the KONP-based Cauchy-combination test statistic.

Examples

```
# gastric cancer data
data(gastric)

konp_test(gastric$time, gastric$status, gastric$group, n_perm=10^3)
```

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