Model Evaluation

Considerations for Time-to-Event Studies

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Overview

- Time to Event Studies
- Classical Model Evaluation Tools
- Integrated Brier Score
- Concordance-Index
- Discussion
- Further Considerations

Time-to Event Studies

- Analysis working with (right) censored data
- Highly relevant for clinicians in the field of medical statistics e.g. looking at when a patient dies or when he gets a disease (clinical/epidemiological studies)
- In Economics/Finance e.g. to examine when a subject/borrower will default or when a subject will find/lose a job
- Operations research to predict the time a machine will break

Basic Notations & Concepts

- Time T and Survival S
- From hazard to cumulative hazard to survival
- Hazard h(t,x) is the eminent probability of death a specific

mlr3Proba

```
## <TaskSurv:interval_censored> (178 x 6)
## * Target: start, stop
## * Properties: -
## * Features (4):
##   - dbl (2): enum, rx
##   - int (2): number, size

## <MeasureSurvCindex:surv.harrell_c>
## * Packages: -
## * Range: [0, 1]
## * Minimize: FALSE
## * Properties: -
## * Predict type: crank
## * Return type: Score

## INFO  [17:12:50.485] Benchmark with 9 resampling iterati
## INFO  [17:12:50.696] Applying learner 'surv.ranger' on t
## INFO  [17:12:51.739] Applying learner 'surv.coxph' on ta
## INFO  [17:12:52.554] Applying learner 'surv.kaplan' on t
```