

REGRESSION SURVIVAL MODELLING: FRAILTY MODELS AND LASSO PENALIZATION IN R

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 Biostatistics and Data Management Unit
 Innate Pharma, Marseille (FR)
 Monza, 29th-30th October, 2018

Survival models are widely used in medical research to assess the efficacy of new candidate therapies or the prognostic role played by patient characteristics.

Frailty Models. Inference for regression parameter estimation relies on the assumption of i.i.d. observations. In practice, conditions for this assumption to hold are not met, e.g. when patient are enrolled in several hospital centers or several measures on the same subject are available. Frailty models employ random effects in order to account for unobserved heterogeneity and correlation between observations.

Penalized Regression. If several factors can impact the risk of a clinically relevant event, survival models can be used to perform feature selection. When the set of possible markers is high dimensional, such like in the case of genomic data, selection of the most relevant factors gets statistically challenging. Penalization (also called regularization) of the likelihood via a Lasso constraint allows shrinking the regression parameter estimates toward the origin. This results in some parameter estimates set to exactly 0, which means that the corresponding factors are ruled out of the model.

PROGRAM

SURVIVAL MODELS

- Brief reminder

FRAILTY MODELS (FM)

- Motivating examples
- Univariate *vs* Shared FMs
- Parametric FMs
- Semiparametric FMs
- Research topics
- Practical session with R

LASSO PENALIZATION

- Motivating examples
- Penalized likelihood
- The role of the tuning parameter
- Cross-validation
- Beyond the lasso penalty
- Research topics
- Practical session with R

COURSE SCHEDULE

October 29 th	October 30 th
Frailty Models	Lasso Penalization
9.00- 9.30 Lecture	9.00-10.00 Lecture
9.30-10.00 Practical Session	10.00-10.45 Practical Session
10.00-11.00 Lecture	11.15-12.15 Lecture
11.30-12.15 Lecture	12.15-13.00 Practical Session
12.15-13.00 Practical Session	14.00-15.00 Lecture
14.00-15.45 Lecture	15.00-16.30 Practical Session
16.00-17.00 Practical Session	

PRACTICALS

Participants are required to bring their own laptops with the most recent copy of R and RStudio installed.

The following R packages will be used in the tutorial: `coxme`, `glmnet`, `parfm`, `survival`.

TUTOR

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VENUE

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