

Ph.D. in “Life Course Research” – Socio-demographic curriculum

Academic Year 2023-2024

Advanced survival analysis

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Objectives

The aim of the course is to introduce to the broad family of extended Cox Model. The approach will be model-oriented with a continuous look at real-data. The course aims to cover extended Cox models. These models will be developed along three directions: the first concerns solutions for handling NPH models; the second concerns competing-risks models and multistate models; and the third concerns frailty models.

Monday

10.00 am - 12.00 am, Violations of the PH assumptions in the Cox Model. Introduction to NPH models (ATTANASIO)

12.15 pm - 13.45 pm, Applications with R (BATTAGLIA)

Tuesday

10.00 am - 11.30 am, Solutions to overcome NPH: time-dependent covariates; time-varying covariates; piecewise PH models (ATTANASIO)

11.30 am - 12.30 pm, Competing Risks: Naïve and unbiased Survival Estimator (FIOCCO)

14.00 pm - 15.30 pm, Applications with R (BATTAGLIA)

Wednesday

10.00 am - 13.00 pm, Regression models for CR; Multistate models in survival analysis (FIOCCO)

Thursday

10.00 am - 13.00 pm, Introduction to frailty Models in survival analysis (ENEA)

Suggested references

- Klein, J.P., Moeschberger, M.L. (2003), Survival Analysis – Techniques for censored and truncated data, Springer

- Putter, H., Fiocco, M. and Geskus, R. B. (2007), Tutorial in biostatistics: competing risks and multi-state models. *Statistics in Medicine*, 26: 2389–2430
- Balan, Theodor A., and Hein Putter (2020), A tutorial on frailty models. *Statistical methods in Medical Research*, 29: 3424-3454.

Requirements

First course in survival analysis (survival data and censoring; survival functions estimators; test comparison survival functions; Cox model)