



UNIVERSITÀ
DEGLI STUDI
DI PADOVA



Seminar

PRIOR SPECIFICATIONS TO HANDLE MONOTONE LIKELIHOOD IN THE COX REGRESSION MODEL

Enrico A. Colosimo

University of Minas Gerais, Belo Horizonte

**January 25, 2018 | 2.30 p.m. | Aula Cucconi
Campus S. Caterina**

Abstract : www.stat.unipd.it/fare-ricerca/seminari

www.stat.unipd.it | www.facebook.com/scienzestatisticheunipd | segrorg@stat.unipd.it

PRIOR SPECIFICATIONS TO HANDLE MONOTONE LIKELIHOOD IN THE COX REGRESSION MODEL*

Enrico A. Colosimo

Titular Professor | Department of Statistics | University of Minas Gerais (Brazil)

The phenomenon of monotone likelihood is observed in the fitting process of a Cox model when the likelihood converges to a finite value while at least one parameter estimate diverges to infinity. Monotone likelihood primarily occurs in samples with sub-substantial censoring of survival times and associated to categorical covariates. In particular and more frequent, it occurs when one level of a categorical covariate has not experienced any failure. A solution suggested by Heinze and Schemper (2001) is an adaptation of a procedure by Firth (1993) originally developed to reduce the bias of maximum likelihood estimates. The method leads to finite parameter estimates by means of penalized maximum likelihood estimation. In this case, the penalty might be interpreted as a Jeffreys type of prior well known in Bayesian inference. However, this approach has some draw-backs, especially biased estimators and high standard errors. In this paper, we explore other penalties for the partial likelihood function in the flavor of Bayesian prior distributions. An empirical study of the suggested procedures confirms satisfactory performance of both estimation and inference. We also explore a real analysis related to a melanoma skin data set to evaluate the impact of the different prior distributions as penalization

Joint work with Frederico A. Machado, Vinícius D. Mayrink