Extensions and applications of the Cox-Aalen survival model

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Abstract: Cox's regression model is the standard regression tool for survival analysis in most applications. Often, however, the model only provides a rough summary of the effect of some covariates. Therefore, if the aim is to give a detailed description of covariate effects and to consequently calculate predicted probabilities, more flexible models are needed. In this talk we consider a flexible extension of Cox's regression model that aimed at extending the Cox model only for those covariates where additional flexibility are needed. One important advantage of the suggested approach is that even though covariates are allowed a nonparametric effect the hassle and difficulty of finding smoothing parameters are not needed. We show how the extended model also leads to simple formulae for predicted probabilities and their standard errors, for example the predicted cumulative incidence function in the competing risk framework.

Key Words: Cox regression, Aalen model, competing risk, cumulative incidence.