

We study the extension of methods from classical survival analysis to competing risks. These methods can be used to analyse time-to-event data. Firstly, we establish notation, define fundamental concepts and present basic theorems and properties. The second chapter explores semiparametric methods for estimating the cumulative incidence function. We compare two methods of estimation: the first treats competing events as censored, while the second takes competing events into account. At the end of the chapter, we prove the asymptotic distribution of the estimator of the cumulative incidence function. Further, we present semiparametric regression methods for estimating cause-specific and subdistribution hazards. Generalisations of the Cox model are used to estimate regression parameters. We introduce proofs of the martingale property for the subdistribution hazard case with complete data. Lastly, we propose a small simulation study to assess the efficiency of the presented nonparametric estimates. Different scenarios with constant cause-specific hazards are simulated and visualized. Additionally, there is one more simulation study for semiparametric estimation methods. Two different Cox models with two covariates for cause-specific hazard are assumed.