
Dependent Censoring Based on Copulas

Ingrid Van Keilegom^{*1} and Claudia Czado²

¹KULeuven – Belgium

²Technical University of Munich – Germany

Abstract

Consider a survival time T that is subject to random right censoring, and suppose that T is stochastically dependent on the censoring time C . We are interested in the marginal distribution of T . In this paper we propose a new model that takes this dependence into account. The model is based on a parametric copula for the relationship between T and C , and on parametric marginal distributions for T and C . Unlike most other papers in the literature, we do not assume that the parameter defining the copula function is known. We give sufficient conditions on these parametric copula and marginals under which the bivariate distribution of (T, C) is identified. These sufficient conditions are then checked for a wide range of common copulas and marginal distributions. We also study the estimation of the model, and carry out extensive simulations and the analysis of data on pancreas cancer to illustrate the proposed model and estimation procedure.

^{*}Speaker