An Algorithm for Estimating Survival under a Copula-Based Dependent Truncation Model: with Applications to Elderly Human's Survival Analysis

Takeshi Emura
Graduate Institute of Statistics, National Central University

Abstract

Elderly human's lifetimes are left-truncated under the sampling criterion that they had to live long enough to enter the study (Channing house data; Hyde, 1977). Conversely, those elderly humans still survive at the end of the study are right-truncated by the study end, which may occur in the National Oldest-old Survivors List and Population Movement Statistics by the Ministry of Health and Labor in Japan (Japanese centenarian data: Sibuya and Hanayama 2004; Murotani et al, 2014).

In the presence of truncation, the product-limit estimator for the survival function has been routinely used, which however is valid under the assumption that the lifetime is quasi-independent of truncation. In this presentation, we revisit the approach of Chaieb, et al (2006) who considers a copula-based dependent truncation model to relax the independence. Then, we propose a new algorithm to estimate the survival function. Finally, the survival data collected from the Channing house study and the Japanese centenarians (survivors at age 100) are analyzed for illustration. This work is based on the paper currently under major revision by *Test*.