Nonparametric Estimation of the Conditional Survival Function with Time-Varying Covariate and Interval Censoring

In this talk we propose a nonparametric approach to estimate the conditional survival function of failure time given a time-varying covariate, \( S(t|z(y); 0 \leq y \leq t) \), when time is subject to interval censoring. In this case, observations appear as \( \{(L_i, R_i, Z(t_{ij})); j = 1, \ldots, K_i, i = 1, \ldots, n\} \). We assume that \( Z(t_{ij}) = \alpha_i + \beta_i t_{ij} + \varepsilon_{ij}; j = 1, \ldots, K_i \), where \( \alpha_i \) and \( \beta_i \) are random effects. We treat the estimate of the slope \( \beta_i \) of the \( i \)-th path as a positive covariate. We propose a weighted average estimator based on generalized Turnbull and Kaplan-Meier estimators to estimate \( P(T_i > t|z(y_i); 0 \leq y_i \leq t) \), \( P(T_i > t|T_i > t_{i0}, z(y_i); 0 \leq y_i \leq t) \) and the \( \gamma \)-th quantile of the distribution of \( \{T_i|z_i(y_i); 0 \leq y_i \leq t\} \), \( q_{\gamma i} \).