



The Hong Kong Polytechnic University **Department of Applied Mathematics**

AMA Distinguished Seminar Series in Data Science and Machine Learning

Semiparametric Regression Analysis of Interval-Censored Data

By

Prof. Danyu Lin University of North Carolina at Chapel Hill

Abstract

Interval censoring arises frequently in clinical, epidemiological, financial, and sociological studies, where the event or failure of interest is not observed at an exact time point but is rather known to occur within a time interval induced by periodic monitoring. We formulate the effects of potentially time-dependent covariates on the interval-censored failure time through semiparametric regression models, such as the Cox proportional hazards model. We study nonparametric maximum likelihood estimation with an arbitrary number of monitoring times for each study subject. We develop an EM algorithm that involves very simple calculations and converges stably for any dataset, even in the presence of time-dependent covariates. We show that the estimators for the regression parameters are consistent, asymptotically normal, and asymptotically efficient with an easily estimated covariance matrix. In addition, we extend the EM algorithm and asymptotic theory to competing risks and multivariate failure time data. Finally, we demonstrate the desirable performance of the proposed numerical and inferential procedures through simulation studies and applications to real medical studies.

Biography

Danyu Lin, Ph.D., is the Dennis Gillings Distinguished Professor of Biostatistics at the University of North Carolina at Chapel Hill. Dr. Lin is an internationally recognized leader in lifetime data analysis and currently serves as an Associate Editor for Biometrika (since 1997) and JASA. He has published over 200 peer-reviewed papers, most of which appeared in top statistical journals. Several of his methods have been incorporated into major software packages, such as SAS, R and STATA, and widely used in practice. Dr. Lin received the Mortimer Spiegelman Gold Medal from the American Public Health Association in 1999 and the George W. Snedecor Award from the Committee of Presidents of Statistical Societies in 2015. Other honors include ASA and IMS Fellows, Thomson ISI's list of Highly Cited Researchers in Mathematics, JASA and JRSS(B) discussion papers, and NIH Merit Award.

Date: 8 June 2022 (Wednesday) Time: 10:00-11:00 (Hong Kong Standard Time GMT +8) Venue: Online Talk via Zoom (Meeting ID: 956 1619 7939) Speaker: Prof. Danyu Lin, University of North Carolina at Chapel Hill Host: Prof. Xingqiu Zhao, The Hong Kong Polytechnic University Click to join: https://polyu.zoom.us/j/95616197939?pwd=cEtPeGtIVUg2R21SYmhvQmRqVGc0QT09



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