

國立東華大學應用數學系

專題演講

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講題：Modeling curves and derivatives as predictors for traffic breakdown probabilities

時間：115年11月06日(星期五) 15:10-17:00

地點：理工一館A316教室

摘要

Motivated by an interest in predicting the status of road traffic congestion within a short period, we propose a generalized functional linear regression model for predicting traffic breakdown probabilities. In the proposed model, traffic congestion status is the response variable, and we utilize the observed traffic speed trajectories and their first two derivatives as functional predictors, representing different features of a random function. While the derivatives of a trajectory may contain useful information, they cannot be observed directly and so must be estimated. To address this challenge, we apply the Karhunen–Loève representation to individual functional predictors, including the trajectory and its derivatives. The regression model is reparameterized to represent both the integrated regression effect and the predictor-specific effects. The importance of these effects is indicated by the corresponding weight parameters. Our numerical studies demonstrate that the modeling approach is useful in its application to freeway traffic data; in particular, the use of speed trajectory derivatives as predictors for traffic status successfully enhances prediction accuracy.