

# 淡江大學數學系演講公告

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題目：Instrumental variable method in causal mediation analysis

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時間：下午 14:10 開始

地點：科學館 S433 室

## 摘要 Abstract:

Causal mediation analysis is a powerful technique to assess how exposure affects the outcome of interest mediated through an intermediated variable (mediator). By incorporating with the counterfactual model, causal mediation analysis can further yield substantial insight into the causal mechanism by assessing natural direct and indirect effects. In this talk, I will show a critical problem for causal mediation analysis arising from the assumptions regarding no unmeasured confounding. The conventional methodologies require assuming all confounding variables are measurable and are collected in analysis to achieve causal interpretation. However, checking this assumption presents practical challenges. To remedy this problem, an instrumental variable is introduced to relax the assumption of no unmeasured confounding. A multiply robust estimation method is derived to mitigate the model misspecification problem. We prove that the proposed estimator is consistent, asymptotically normal, and achieves the semiparametric efficiency bound. As an illustration, we apply the proposed method to genomic datasets of lung cancer to investigate the potential role of the epidermal growth factor receptor in the treatment of lung cancer.

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