

# 國立中山大學應用數學系

## 學術演講

講者：Professor Cathy Yi-Hsuan Chen  
University of Glasgow

講題：SONIC: Social Network with Influencers and  
Communities

時間：2019/12/4 (Wednesday) 15:10 ~ 16:00

地點：理學院四樓理 SC 4009-1 室

茶會：16:00 於理 SC 4010 室 (系辦公室)

### Abstract

The integration of social media characteristics into an econometric framework requires modeling a high dimensional dynamic network with dimensions of parameter  $\Theta$  typically much larger than the number of observations. To cope with this problem, we introduce a new structural mode—SONIC which assumes that (1) a few influencers drive the network dynamics; (2) the community structure of the network is characterized as the homogeneity of response to the specific influencer, implying their underlying similarity. An estimation procedure is proposed based on a greedy algorithm and LASSO regularization. Through theoretical study and simulations, we show that the matrix parameter can be estimated even when the observed time interval is smaller than the size of the network. Using a novel dataset retrieved from a leading social media platform—

StockTwits and quantifying their opinions via natural language processing, we model the opinions network dynamics among a select group of users and further detect the latent communities. With a sparsity regularization, we can identify important nodes in the network.

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