

# 國立中山大學應用數學系

## 學術演講

講者：劉月琴教授 (Department of Statistics, Rutgers University, USA)

講題：Prediction with Confidence – General Framework for Predictive Inference

時間：2021/05/20 (Thursday) 14:10 ~ 15:00

地點：理學院四樓理 SC 4009-1 教室

茶會：13:30 於理 SC 4010 室 (系辦公室)

### Abstract

We present a general framework for prediction in which a prediction is in the form of a distribution function, called ‘predictive distribution function’. This predictive distribution function is well suited for prescribing the notion of confidence under the frequentist interpretation and providing meaningful answers for prediction-related questions. Its very form of a distribution function also lends itself as a useful tool for quantifying uncertainty in prediction. A general approach under this framework is formulated and illustrated using the so-called confidence distributions (CDs). This CD-based prediction approach inherits many desirable properties of CD, including its capacity to serve as a common platform for directly connecting the existing procedures of predictive inference in Bayesian, fiducial and frequentist paradigms. We discuss the theory underlying the CD-based predictive distribution and related efficiency and optimality. We also propose a simple yet broadly applicable Monte-Carlo algorithm for implementing the proposed approach. This concrete algorithm together with the proposed definition and associated theoretical development provide a comprehensive statistical inference framework for prediction. Finally, the approach is illustrated by simulation studies and a real project on predicting the application submissions to a government agency. The latter shows the applicability of the proposed approach to even dependent data settings.

This is joint work with Jieli Shen, Goldman Sachs, and Minge Xie, Rutgers University.

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