



統計科學研究所

INSTITUTE OF  
STATISTICAL SCIENCE



統計所學術演講



中研院統計所

## 學術演講

講題：Order-of-addition Experiments: Design and Analysis

講者：Distinguished Prof. Dennis K. J. Lin 林共進教授  
( Department of Statistics, Purdue University,  
West Lafayette, IN)

時間：2023年7月3日(星期一)，10:30-12:00

地點：統計所B1演講廳

### Abstract

In Fisher (1971), a lady was able to distinguish (by tasting) from whether the tea or the milk was first added to the cup. This is probably the first popular Order of Addition (OofA) experiment. In general, there are  $m$  required components and we hope to determine the optimal sequence for adding these  $m$  components one after another. It is often unaffordable to test all them! treatments (for example,  $m!=10!$  is about 3.5 millions), and the design problem arises. We consider the model in which the response of a treatment depends on the pairwise orders of the components. The optimal design theory under this model is established, and the optimal values of the D-, A-, E-, and M/S-criteria are derived. For Model-Free approach, an efficient sequential methodology is proposed, building upon the basic concept of quick-sort algorithm, to explore the optimal order without any model specification. The proposed method is capable to obtain the optimal order for large  $m$  ( $\geq 20$ ). This work can be regarded as an early work of OofA experiment for large number of components. Some theoretical supports are also discussed. One case study for job scheduling will be discussed in detail.

※ 實體與線上視訊同步進行。

※ 茶會：10：10開始。



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## Seminar

Title : Order-of-addition Experiments: Design and Analysis

Speaker : Distinguished Prof. Dennis K. J. Lin

林共進教授

( Department of Statistics, Purdue University,  
West Lafayette, IN )

Time : 10:30 ~ 12:00, Monday, July 3, 2023

Place : Auditorium, B1F, Institute of Statistical Science

### Abstract

In Fisher (1971), a lady was able to distinguish (by tasting) from whether the tea or the milk was first added to the cup. This is probably the first popular Order of Addition (OofA) experiment. In general, there are  $m$  required components and we hope to determine the optimal sequence for adding these  $m$  components one after another. It is often unaffordable to test all them! treatments (for example,  $m!=10!$  is about 3.5 millions), and the design problem arises. We consider the model in which the response of a treatment depends on the pairwise orders of the components. The optimal design theory under this model is established, and the optimal values of the D-, A-, E-, and M/S-criteria are derived. For Model-Free approach, an efficient sequential methodology is proposed, building upon the basic concept of quick-sort algorithm, to explore the optimal order without any model specification. The proposed method is capable to obtain the optimal order for large  $m$  ( $\geq 20$ ). This work can be regarded as an early work of OofA experiment for large number of components. Some theoretical supports are also discussed. One case study for job scheduling will be discussed in detail.

※ Online live streaming through Cisco Webex will be available.

※ The tea reception will be held at 10:10.