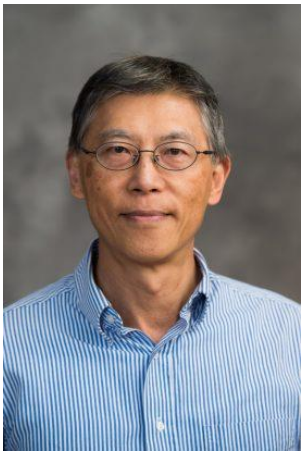
周元燊院士講座

主講者: 邢泰侖 (Tailen Hsing) 教授



邢教授為美國密西根大學統計系的講座教授 (Michael B. Woodroofe Collegiate Professor of Statistics),主要研究領域包括 Extreme value problems、functional data、long-range dependence、space-time models 等。

邢教授在統計與機率方面研究工作十分傑出。許多研究成果發表在國際頂尖期刊如 Annals of Statistics、Annals of Applied Statistics、Journal of the Royal Statistical Society、Series B, Biometrika、Annals of Probability、 Statistica Sinica、Extreme 等。邢教授為第一位台灣統計學者擔任 Annals of Statistics 的 co-editor。同時亦擔任多種頂尖統計與期刊編輯委員如 Statistical Science、Bernoulli、Statistica Sinica 等。邢教授於 2010-2015 擔任美國密西根大學統計系系主任。目前亦擔任中研院統計科學研究所諮詢委員。

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- Hsing, T., Brown, T., and Thelen, B. (2016). Local intrinsic stationarity and its inference, *Annals of Statistics* **44** , 2058-2088.
- Chiou, J.-M., Chen, Y.-T., and Hsing, T. (2019). Identifying multiple changes for a functional data sequence with application to freeway traffic segmentation, *Annals of Applied Statistics* **13** , 1430-1463.
- Shen, J. and Hsing, J. (2020). Hurst index estimation, *Annals of Statistics* **48** , 838-862.
- Li, J., Li, Y. and Hsing, T. (2021). On functional processes with multiple discontinuities, *JRSSB.* **84** , 933-972.
- Yagers, D., Stoev, S., and Hsing, T. (2022). A functional-data approach to the Argo data, *Annals of Applied Statistics* **16** , 216-246.
- Shen, J., Stoev, S., and Hsing, T. (2022). Tangent fields, intrinsic stationarity, and self similarity, *Electronic Journal of Probability,* **27** 1-56.
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- Kartsioukas, R., Stoev, S., and Hsing, T. (2023). Spectral density estimation of function-valued spatial processes.

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A functional-data perspective of the Argo data

Abstract

The Argo data is a modern oceanography dataset that provides unprecedented global coverage of temperature and salinity measurements in the upper 2,000 meters of depth of the ocean. In this talk, we present our approaches on two specific problems from the perspective of functional data analysis. First, we develop spatio-temporal functional kriging methodology for mean and covariance estimation to predict temperature and salinity as a smooth function of depth. Second, we discuss the functional co-kriging problem of predicting oxygen concentration based on temperature and salinity data. By combining tools from functional and spatial data analysis, including smoothing splines, local regression, and multivariate spatial modeling and prediction, our approaches provide advantages over current methodology in oceanography research that consider pointwise estimation/prediction at fixed depths.