

國立政治大學應用數學系  
Department of Mathematical Sciences, National Chengchi University  
**Distinguished Lecture Series**

- Speaker:** 張德健教授 (Prof. Der-Chen Chang)  
(Department of Mathematics and Statistics. Georgetown University, USA)
- Title:** Introduction to Fourier Analysis and Its Applications to PDEs (II)
- Time:** (i) 2:00-4:00 PM, Friday, December 11, 2020  
(ii) 2:00-4:00 PM, Friday, December 18, 2020  
(iii) 10:00 AM-12:00PM, Monday, December 21, 2020  
(iv) 2:00-4:00 PM, Friday, December 25, 2020
- Venue:** (待人數確定後，另行通知)

### Abstract

This series of lectures cover a specific branch of analysis – Fourier analysis. This is a very broad field, and we consider only a few problems indicative of the role that advanced calculus and real analysis play in applications. Fourier analysis also happens to be a field whose development had a great impact on the theory of partial differential equations and modern analysis. We begin. Besides basic concepts in real analysis, we will also discuss some new research areas in harmonic analysis that are developed in the past 30 years. For example, we hope to discuss Fourier series and Fourier transform of functions in the spaces  $L^1$ ,  $L^2$ , and  $L^p$ ,  $1 < p < 2$ . Then we shall introduce distribution theory and extend the Fourier transform to  $L^p$ ,  $2 < p < \infty$ . The Hardy-Littlewood maximal function and the Hilbert transform will be also discussed and we will show that they define as bounded operators on  $L^p$ ,  $1 < p < \infty$ .

**Prerequisites:** Multivariable Calculus, Linear Algebra and Analysis I.

**Textbook:** “*Selected Topics in Fourier Analysis*” by Der-Chen Chang and Cora Sadosky. (Unpublished lecture notes).

**Supplementary Textbook:** “*Heat Kernels for Elliptic and Sub-elliptic Operators*” by Ovidiu Calin, Der-Chen Chang, Kenro Furutani and Chisato Iwasaki

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