2013 數學模式與科學研究 -短期課程
2013 Mathematical Models and Scientific Research-Short Course
地點: R204, 2F, NCTS, NCKU

　　電腦科學家**Turing**曾說過『數學模式是對問題的簡化與理想化（甚至虛假化）。但數學模式在現有知識架構下，保留最重要的問題特性以供討論，進而協助研究未知瞭解科學。數學模式就是以數學符號與觀念對自然界事物進行表達與分析的工具，我們透過模式觀察周遭事物與研究科學。

　　本短課程目的以數學模式強化科學研究能力。透過簡單數學模式與重要實用例子說明1』控制方程式的尋求；**2**』解與分析；**3**』科學銓釋等三個建模過程。模式例子包含物理科、生命科學、防疫學、生態學、地球科學以及人文社會科學等領域；除此之外課程也將討論掠食與被掠食交互作用，魚獲生態影響，以及消耗戰等重要古典數學模式。數學函數本身是無因次，科學量化卻有單位，課程也將介紹因次分析與尺度分析於科學研究的應用。課程先需為基礎微積分知識。

　　As Turing once said " This model will be a simplification and an idealization, and consequently a falsification. It is to be hoped that the features retained for discussion are those of greatest importance in the present stage of knowledge." Mathematical model is a representation and analysis of reality through mathematical symbols and concepts. We will see reality through models!

　　This short course is aim to give a college-level science students how to use differential equations to facilitate the scientific research. This short course teaches how simple mathematics can help formulate, solve, and interpret real problems of current interest. The model examples cover a wide range of fields, including biology, ecology, geophysics, engineering, and social sciences. Classical modeling topics such as predator-prey interaction, disease control, harvesting and wars of attrition are also included. Moreover, the dimensional analysis and scale analysis of scientific problem will be discussed. The prerequisites of the course are elementary calculus.

Hosted By National Center for Theoretical Sciences (South) With

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歡迎各位大學部與大學部同學踴躍報名參與!!!

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課程內容與講題:

日 期	時 間	主講人	講題
July 31	10:00-12:00	郭鴻基教授	數學建模簡介
	14:00-17:00		非綫性動力與相位圖分析
Aug. 1	10:00-12:00	郭鴻基教授	多尺度動力、回饋與遲滯
	14:00-17:00		偏微分模式
Aug. 2	10:00-12:00	郭鴻基教授	多尺度與因次分析
	13:00-14:00	舒宇宸教授	計算電磁中介電係數的數值模型
	14:00-15:00	劉珈銘教授	幾何中的不變量 ： 從微積分到代數拓樸
	15:00-15:30	王辰樹教授	隨機訊號的線性濾波之數值實現
	16:00-16:30	陳旻宏教授	Agent Based Model（數學館四樓電腦教室）
	16:30~		數學模型上機實習（數學館四樓電腦教室）

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歡迎各校大學部專題生報名與課程參與!!!