

非線性動力學與混沌 – 11220PHYS585500

Nonlinear Dynamics and Chaos

授課老師：吳國安教授 Email: kuoan.wu@gmail.com

開課對象：

Undergraduate students at all levels are welcomed to take the course. There are no prerequisites. Basic programming knowledge is helpful but not required. Graduate students are welcomed to take the course as well.

課程大綱：

This course aims to introduce fundamental ideas for analyzing nonlinear phenomena and to give students hands-on experiences by working out classical nonlinear model systems (both analytically and numerically). Related topics are fixed points, linear stability analysis, phase portraits, bifurcations, limit cycles, iterated maps, instabilities, pattern formation, etc. Possible hands-on topics include reaction-diffusion equation (Turing instability), Van der Pol oscillators or Fitzhugh-Nagumo model (excitable media), Swift-Hohenberg Equation or phase-field crystal model (pattern formation), Kuramoto model or Vicesk model (active systems), etc.

上課時間： F5F6F7、教室： R620, Physics Building

課程用書：上課筆記

參考書目：

1. “Nonlinear dynamics and chaos” by *S. H. Strogatz*
2. “Pattern Formation and Dynamics in Nonequilibrium Systems” by *H. Greenside & M. C. Cross*
3. “Pattern formation outside of equilibrium” by *M. C. Cross and P. C. Hohenberg*, [Rev. Mod. Phys. 65, 851 \(1993\)](#)

評分方式：

The course grade is evaluated based upon your term project. You are expected to propose a research project related to (or not related to) the materials introduced in class. You are expected to give two oral presentations – a proposal and a final report.

助教：TBA