非線性動力學與混沌 – 11020PHYS585500

Nonlinear Dynamics and Chaos

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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)

Office Hour: TBD

演習課: TBD

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 hands-on topics introduced in class. You will give a presentation of your proposal as well as a presentation of your final work. It could be a heavy-loading course, so you are welcome to take the course if you are strongly committed.

助教：TBD

Last updated on December 23, 2021.