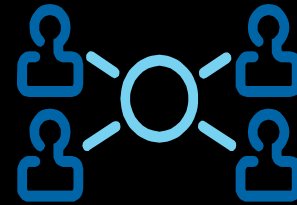
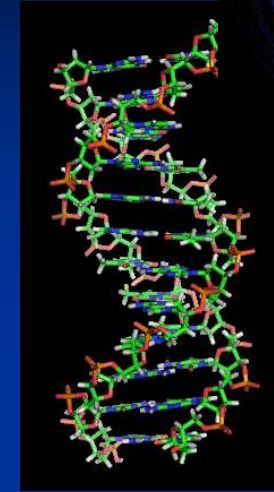


GE2318



FROM ANCIENT WISDOM

TO *MODERN SCIENCE*

古代智慧與現代科學



哲理

物象

The course consists of

■ Part I

I-Ching and DNA

Lecturer: Prof. K.F. Man

■ Part II

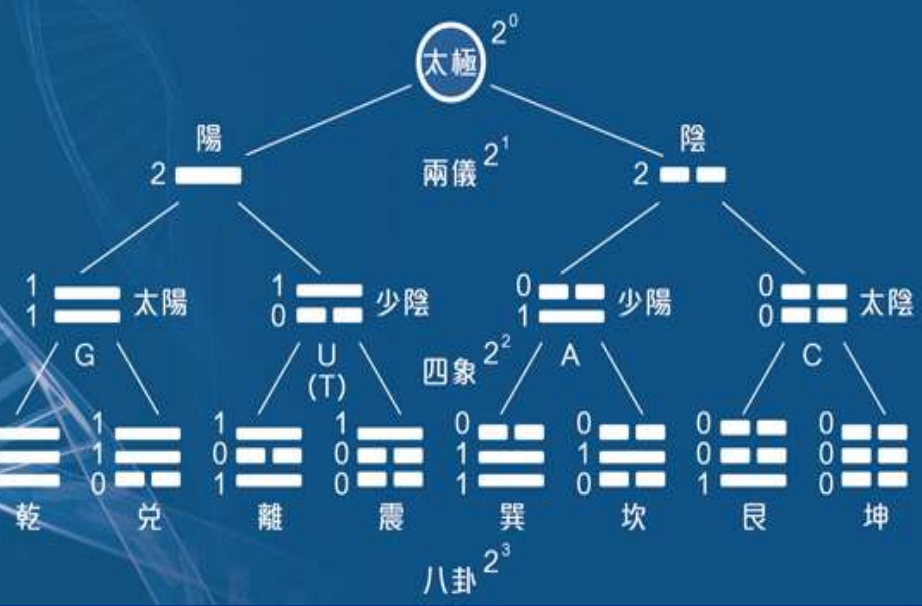
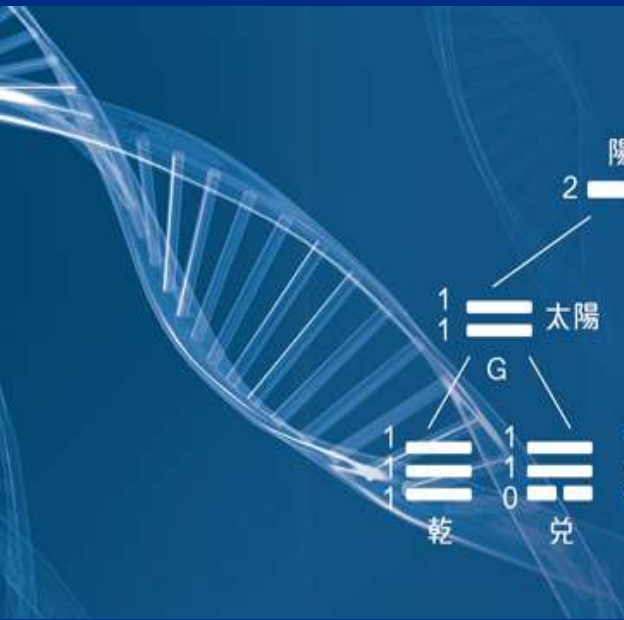
Chaos

Lecturer: Prof. G.R. Chen

■ Part III

Fractals

Lecturer: Dr. Wallace K.S. Tang



Part I – I-Ching (易經) and DNA

Lecturer: Prof. K.F. Man

I-Ching

- 見龍在田, 飛龍在天, 潛龍勿用, 亢龍有悔, ... are not only Kung-Fu in “The Legend of the Condor Heroes” (金庸小說射雕英雄傳), but are also the Hexagrams (卦) in I-Ching

周易上經
 元董中行若水齋
 孔氏微雪樓影鈔本

乾 元亨利貞 乾下上
 六畫皆奇上下皆乾陽之純健之至故名乾文王以
 人君有至健才德則推舉動化當得元亨然必純心
 純政正固不易乃利而元亨可保。王道四達不悖
 元亨也王道至正無私利貞也維根健未是一時事
 元大也亨通也利宜也貞正而固也

初九潛龍勿用
初陽在下龍德而隱者也故宜處而勿出

九二見龍在田利見大人
剛健中止出潛離隱如龍見于田而霖雨及物此遭
 時之大人也君民皆利見之

九三君子終日乾夕惕若厲无咎
重剛不中居下之上大臣處危地者也幸性辭剛健
 能乾惕者在君子夙慎如是則夙夜匪懈區處自周
 雖危何咎

九四或躍在淵无咎
九陽四陰能疑之人居上之下可疑之地故欲進而
 審天命卜人心如龍或躍而尚在淵則審而後進順
 天應人何咎

九五飛龍在天利見大人
剛健中正以居尊位如龍飛于天而澤及天下此德
 位兼隆之入人也臣宜見以翊運民宜見以蒙休

上九亢龍有悔
陽極于上動必有悔。亢者過于上而不能下之意
 也

用九見辟龍无首吉
爻皆用九則陽皆變陰是為治者則濟以柔如龍之
 剛在首而今見其死也不茹不吐畏威懷德吉。蓋
 六陽皆變到而能柔吉之道也

彖曰大哉乾元萬物資始乃統天

This part covers

- Yin-Yang (陰陽) and Sixty Four Hexagrams (六十四卦)
- Biological Genetic Cycle and DNA
- The similarities between Hexagrams and our DNA
-



Part II - CHAOS (混沌)

Lecturer: Prof. G.R. Chen

Chaos (混沌) is not only

■ A description

“Now the earth was formless and empty,” Genesis 1:2

「地是空虛混沌...」創世記一章2節上

■ A god

「南海之帝為儻，北海之帝為忽，中央之帝為渾沌。
...」 -- 莊子內篇·應帝王(渾沌)

■ A monster

「崑崙西有獸焉，其狀如犬，長毛，四足，似羆而無爪，有目而不見，行不開，有兩耳而不聞，有人知性，有腹無五藏，有腸直而不旋，食徑過。人有德行而往抵觸之，有兇德則往依憑之。名為混沌。」《神異經》

■

Chaos is also found in ...

Proceedings of the National Academy of Sciences

www.pnas.org

Published online before print October 16, 2001, doi: 10.1073/pnas.231384098

PNAS October 23, 2001 vol. 98 no. 22 12342-12343

Chaos and stability of the solar system

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[§]National Astronomical Observatory, Tokyo 181, Japan



Chaos and Financial Markets

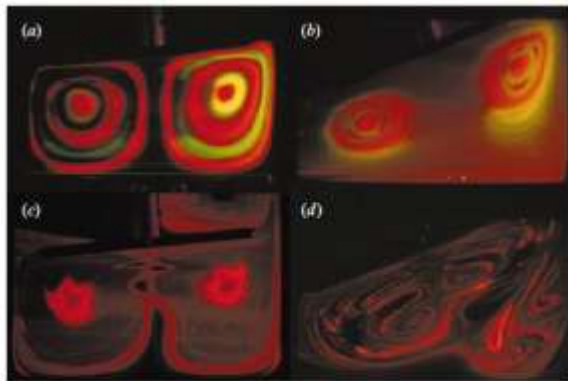


FIGURE 19. Effect of fixed tank speed ($N_T = -3$ RPM) on mixing for different impeller angle fixed impeller speed ($N_I = 30$ RPM). (a, c) $\alpha = 5^\circ$: (a) is without tank rotation, (c) is with rot (b, d) $\alpha = 20^\circ$: (b) is without tank rotation, (d) is with rotation. Regarding efficiency, note th is after approximately 7 hours of mixing while (d) is after 7 minutes.

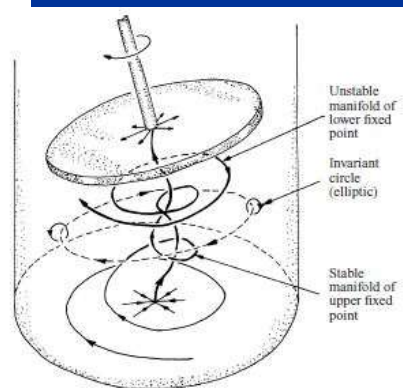
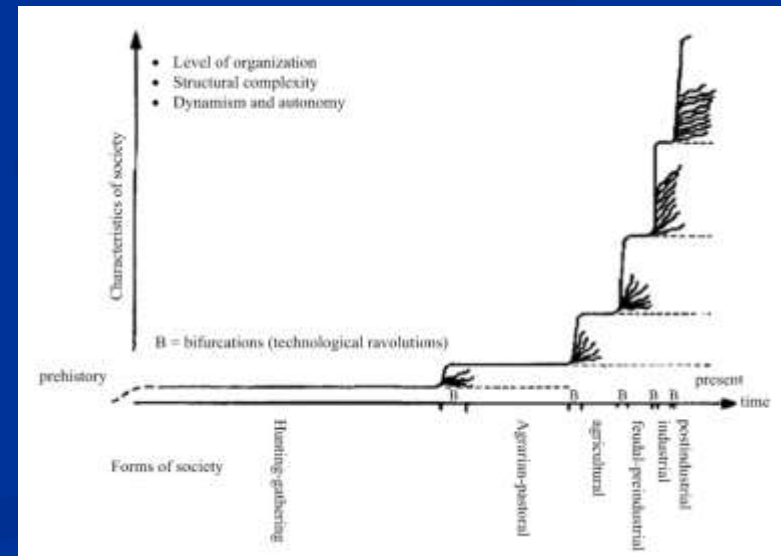


FIGURE 17. Schematic of trajectories.



Chaos and Social Sciences

This part covers

- The birth of Chaos
- The Characteristics of Chaos
- Its Relationship with Ancient Wisdom
- Its Real World Applications: Engineering, Financial market, Social sciences, etc.



Part III - Fractals

Lecturer: Dr. Wallace K.S. Tang

Fractals

- You know one-dimensional, two dimensional or three-dimensional objects. But what is an object with a dimension of 1.585??
- How to draw a beautiful picture with a simple geometrical transform?



This part covers

- From Chaos to Fractals
- Self-similarity concept in Fractals
- Dimension of Fractals
- Software for Fractals art drawing
- Brief descriptions of Fractals applications
 - Art drawing
 - Engineering
 - Social Sciences

TLA and Assessments

Teaching and Learning Activities

- Lectures
- Projects
- In-class activities
- Self-learning and reading

Assessments

- Details on the assessment tasks will be given by the respective lecturer. Examples include:
 - Reading and Reflective writing
 - Art drawing
 - Group discussions and presentation
 - ...