國立臺北大學自然資源與環境管理研究所
九十七學年度第二學期
『環境系統分析』課程講義（四-1）

進度：整數規劃、網路模式與專案管理

- INTEGER PROGRAMMING
  - □ Integer Programming with Network Formulations
    - ⇨ Transportation Problem (Hillier and Lieberman, p.356)
    - ⇨ Assignment Problem (Hillier and Lieberman, p.384)
  - □ Facility Siting Systems (Location Theory or Location Analysis)
    - ⇨ Location Set Covering Problem
    - ⇨ Plant Location Problem
  - □ Solution Technique and Software Packages for IP
    - ⇨ Branch and Bound; Cutting Plane
    - ⇨ Packages: LINGO => @GIN, @BIN; GAMS => RMIP, MIP; What'sBest!

- NETWORK MODEL
  - □ Introduction => *c.f.*: Continuous Mathematical Programming
  - □ Terminology: Node (Vertex), Arc (Link), Path, and Graph (Tree); Flow and Direction
  - □ Classical Network Programming Models (Hillier and Lieberman, 2001, Chap.9)
    - ⇨ Shortest-Path Problem; Minimum Spanning Tree Problem
    - ⇨ Maximum Flow Problem; Minimum Cost Flow Problem
  - □ Other Models: Traveling Salesman Problem

- REVIEW OF PROBABILITY THEORY AND STOCHASTIC PROCESSES
  - □ The Axioms of Probability

    設隨機事件的樣本空間為 Ω，對於 Ω 中的每一個事件 A，都有實函數 P(A)，滿足：
    1. 非負性：$P(A) \geq 0$；
    2. 規範性：$P(\Omega) = 1$
    3. 可加性：對 n 個兩兩互不相容的事件 $A_1,..., A_n$ 有：$\sum_{i=1}^{n} P(A_i) = P\left(\bigcup_{i=1}^{n} A_i \right)$

    任意一個滿足上述條件的函數 P 都可以作為樣本空間 Ω 的機率函數，稱函數值 P(A) 為 Ω 中事件 A 的機率。
  - □ Random Variables: Discrete and Continuous
  - □ Statistics (Moments) of a Random Variable: Expected Value, Variance, …etc.

- HOMEWORK #2 (3/31/2009 Due)
  1. Use What'sBest to solve Hillier and Lieberman (2001) Problem 12.4-8.
  2. Use MS-Project to solve Hillier and Lieberman (2001) Problem 10.3-1 (a)&(b). Hand in the MS-Project (*.mpp) file with the Gantt Chart (indicating Critical Path) and the Arrow Diagram drawn.