

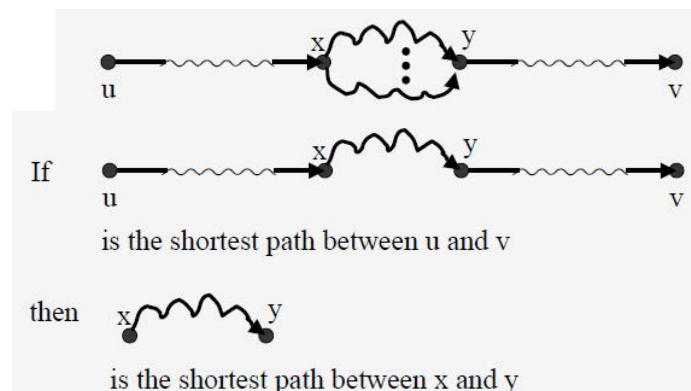
國立臺北大學自然資源與環境管理研究所
101 學年度第二學期 『環境系統分析專題』

課程講義(十四)：動態規劃與目標規劃
Dynamic Programming and Goal Programming

Chapter 6: Dynamic Programming (<http://www.cs.berkeley.edu/~vazirani/algorithms/chap6.pdf>)
4.2 動態規劃法 (http://chern.ie.nthu.edu.tw/alg2003/Suppl_8_multi-stage.PDF)
Dynamic Programming (Chapter 11) in *Applied Mathematical Programming*
(<http://web.mit.edu/15.053/www/AMP-Chapter-11.pdf>)

● INTRODUCTION TO DYNAMIC PROGRAMMING

- Formulation of DP? => No Specific Forms
- Principle of Optimality
- Terminology: Stage, State, Decision, Return, Recursive Equation
- Dynamic programming is a technique for solving problems with a recursive structure with the following characteristics:
 - ⇒ Optimal substructure (principle of optimality): An optimal solution to a problem can be decomposed into optimal solutions for sub-problems.
 - ⇒ A small number of sub-problems: The total number of sub-instances to be solved is small.
 - ⇒ Overlapping sub-problems: During the computation same instances are referred to over and over again.



● GOAL PROGRAMMING

- Criteria for Decision-Making: Attribute, Objective, Target, and Goal
- Multiple Criteria Decision Making: Multiple Attribute and Multiobjective
- Classification of Goal Programming: Non-Preemptive vs. Preemptive
- Non-Preemptive Goal Programming
 - ⇒ Complementary relationship
 - ⇒ One-sided vs. Two-sided
- Preemptive Goal Programming or Lexicographic GP
 - ⇒ Sequential procedure
 - ⇒ Streamline procedure
- Graphical Solution Procedure
- Drawbacks: Normalization and Weighting; Pareto Optimality?