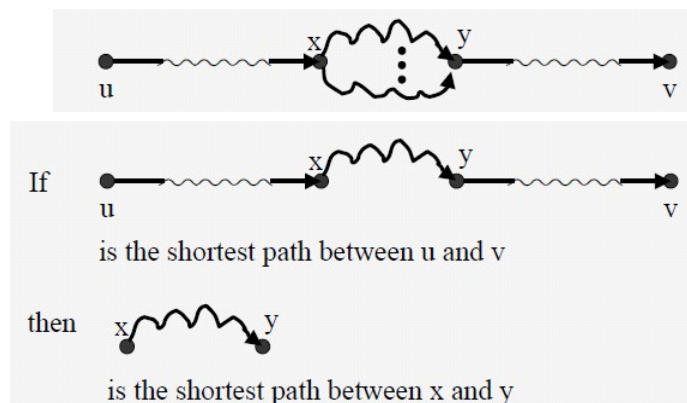


國立臺北大學自然資源與環境管理研究所
109 學年度第二學期 『環境系統分析專題』

課程講義(04)：動態規劃與目標規劃
Dynamic Programming and Goal Programming

● INTRODUCTION TO DYNAMIC PROGRAMMING

- Dynamic Programming = Divide and Conquer + Memorization
- No Specific Forms or Formulations=> 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.



- An Example of Dynamic Programming: The Shortest Path Problem
 - ⇒ Backward vs. Forward

● GOAL PROGRAMMING

- Criteria for Decision-Making: Attribute, Objective, Target, and Goal
 - ⇒ The UN SDGs: Goals, Targets, and Indicators
- 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
- Drawbacks: Normalization and Weighting; Pareto Optimality?
- An Example of Goal Programming: Expansion of Production Lines