PRESENTATION ON ISSUES IN TRANSPORTATION PROBLEMS

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Outline of the presentation

- Unbalanced supply and demand
- Degeneracy in the transportation problem
- An alternative optimal solution
- Prohibited transportation routes
- Maximization transportation problem
- Transshipment problems

UNBALANCED SUPPLY AND DEMAND

- Unbalanced Transportation Problem is If the total supply is not equal to the total demand then the problem is known as an unbalanced transportation problem.

- If the total supply is more than the total demand, we introduce an additional column, which will indicate the surplus supply with transportation cost zero.
- Similarly, if the total demand is more than the total supply, an additional row is introduced in the table, which represents unsatisfied demand with transportation cost zero.
- Solution procedure for the unbalanced transportation problem consists of the following procedure ;
  - The mathematical formulation of the unbalanced transportation problem.
  - Existence of feasible solution for unbalanced TP.
  - Transportation Table for unbalanced TP and modified balanced TP
  - Initial Basic Feasible Solution using Standard Deviation Method

DEGENERACY IN THE TRANSPORTATION PROBLEM

- If the basic feasible solution of a transportation problem with m origins and n destinations has fewer than m + n – 1 positive xij (occupied cells), the problem is said to be a degenerate transportation problem
- Degeneracy can occur at two stages:
  - At the initial solution
  - During the testing of the optimum solution
- A degenerate basic feasible solution in a transportation problem exists if and only if some partial sum of availability (row(s)) is equal to a partial sum of requirements (column(s)).
- If degeneracy is encountered, then it can be handled quite easily by writing an explicit zero in the cell corresponding to the zero-valued basic variable, and treating it in the usual way. This enables us to distinguish the zero-valued basic variable from the nonbasic ones.

AN ALTERNATIVE OPTIMAL SOLUTION

- An alternative optimal solution to a minimization transportation problem exists whenever the opportunity cost corresponding to unused route of transportation is Positive with at least one equal to zero.
- In the world ,alternate optimal solutions provide management with greater flexibility in selecting and using resources

PROHIBITED TRANSPORTATION ROUTES

- Many practical solutions, some of the routes in transportation are prohibited due to certain operational problems such as flood situations, road conditions, and government restrictions
- to minimum cost route’ is the principle that prevents allocation to prohibited routes when we designate “M’ (maximum cost) to the prohibited route.
- Can be handled for solving transportation problems by converting these operational problems in to the mathematical problem
- By assigning a very high cost of transportation to these prohibitive routes to ensure that these routes will not be included in the final optimal solution.

MAXIMIZATION TRANSPORTATION PROBLEM

- There are certain types of transportation problems where the objective function is to be maximized instead of being minimized.
- These problems can be solved by converting the maximization problem into a minimization problem.

TRANSSHIPMENT PROBLEMS

- Are transportation problems in which a shipment may move through intermediate nodes (transshipment nodes)before reaching a particular destination node.
- Transshipment problems can be converted to larger transportation problems and solved by a special transportation program.

❖ **Formulation of the problem**

a few initial assumptions are required in order to formulate the transshipment problem completely:

  - One uniform good exists which needs to be shipped

- Transportation simultaneously starts at the origins and is possible from any node to any other (also to an origin and from a destination)
- The transshipment problem is a unique linear programming problem (LLP) in that it considers the assumption that all sources and sinks can both receive and distribute shipments at the same time (function in both directions)

THANK YOU FOR YOUR ATTENTION