

Transportation Problem

Transportation problem involves a problem where goods are to be transported from production locations to sales locations/Godowns with an objective of

- (a) To meet demand and supply constraints
- (b) To minimise the transport cost

STEPS IN SOLVING THE TRANSPORTATION PROBLEM

- (1) Preliminary Check
- (2) Initial Basic Feasible Solution (IBFS)
- (3) Optimality Check

Methods

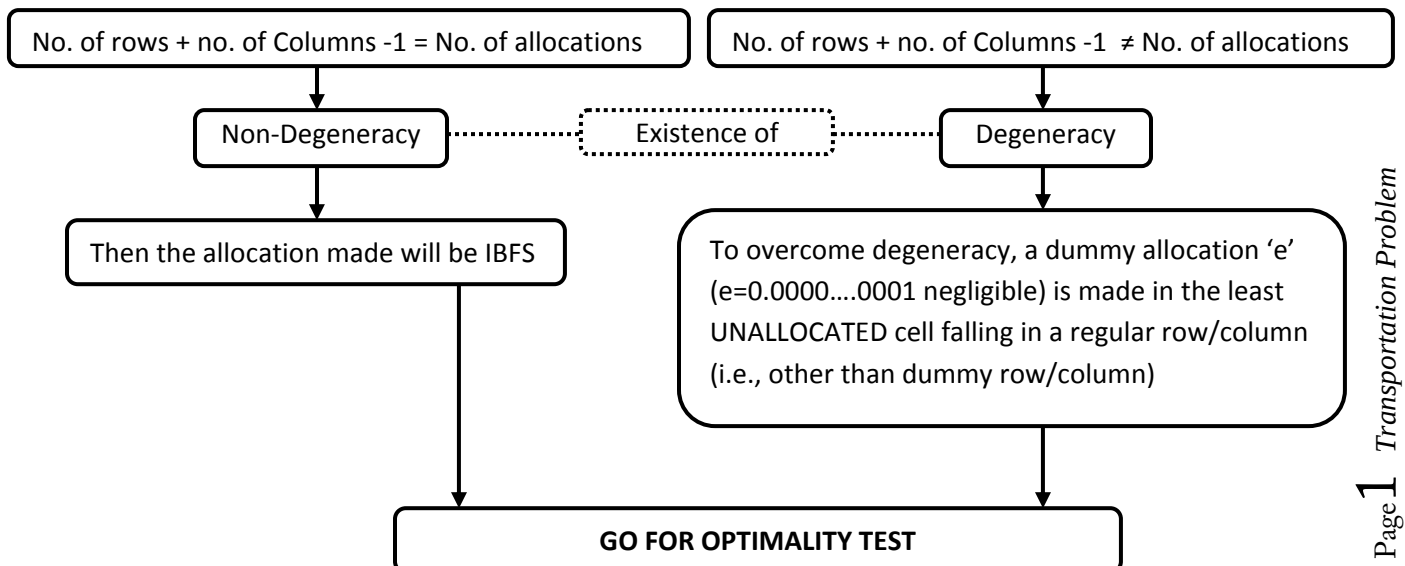
North West Corner Rule

Least Cost Cell Method

Vogel's Approximation Method

STEPS (VOGEL'S APPROXIMATION METHOD [VAM])

- 1) If profit matrix is given, convert it into opportunity loss matrix by subtracting from the highest profit digit every cell
- 2) Check whether the matrix is balanced or not (Demand = Supply)
- 3) If not balanced, balance it by inserting dummy row/column with 0 cost (or as given in question)
- 4) For every row and column compute the difference between least cost and second least cost
If there is a tie (two equal numbers) then difference will be zero
- 5) Identify the highest difference in the row/column
In the highest row/column identify the lowest cost cell and allocate, subject to demand/supply whichever is minimum to that cell
Whichever row/column whose demand or supply is exhausted, strike it off
- 6) Repeat point (4) and Point (5) until all demand and supply allocation are exhausted
- 7) **CHECK FOR DEGENERACY**



8) **OPTIMALITY TEST** is done by first evaluating allocated cells and then unallocated cells

9) **EVALUATION OF ALLOCATED CELLS**

(a) Name the

- ✓ ROWS as R1, R2, R3...
- ✓ COLUMNS as C1, C2, C3...

(b) Assume the value of R1 as '0' zero

(c) Derive the values by adding the cell address eg. R1C1 allocated cell will be done as follows
 $R1 + C1 = \text{cost of the cell as } R1 + 0, C1 = \text{cost of the cell}$

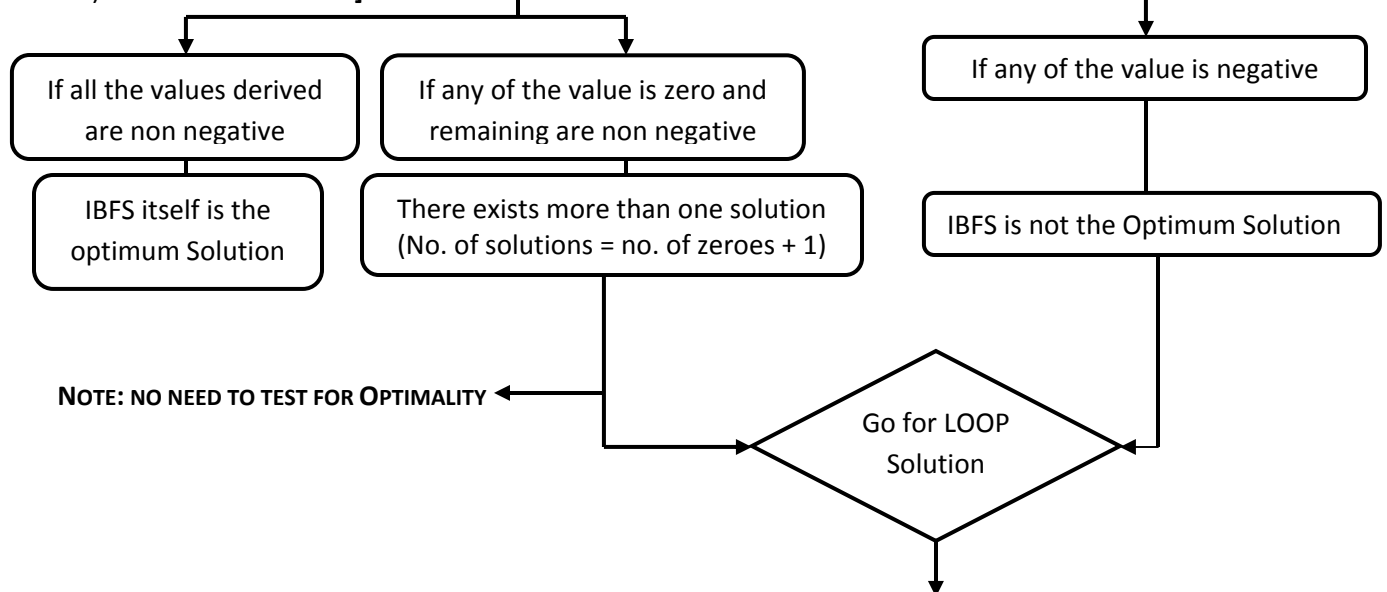
(d) By following the above procedure find the values of R1, R2... and C1, C2...

10) **EVALUATION OF UNALLOCATED CELLS**

Substitute the values derived above as under

- ✓ **UNALLOCATED CELL VALUE-ROW VALUE-CELL VALUE** $R1C2 - R1 - C2$
- ✓ Repeat the above procedure for all the Unallocated cells

11) Result from Point 10]



LOOP RULES:

1. Identify the worst negative (if there is a tie choose the least cost cell)
2. Draw loop with the following rules
 - (a) Loop should commence from and end in the selected worst negative cell
 - (b) It should have only allocated cells as its other corners
 - (c) Only horizontal/vertical lines are allowed
 - (d) Loop should result in even sided figure
3. Identify the worst negative cell mark it with '+' sign and others '-' and '+' alternatively
4. Select the minimum quantity from the negative corners and add this to '+' corners and deduct from the '-' corners without altering the remaining allocations
5. In case of negative values obtained in **EVALUATION OF UN ALLOCATED CELLS OPTIMALITY TEST** should be conducted and this procedure (Evaluation-Loop-Optimality-Evaluation) should be repeated until the Evaluation of unallocated cells give non-negative values