

Objective: assign only one work to one person only and cost is also minimum.

Use minimization or cost matrix when doing (LP); if maximization matrix/given subtract the highest value from all to derive minimum matrix/cost matrix. (U3 - pg. 12-40)

Chapter 12.

The Assignment Problem

Imp: - when we are making

one table what kind of LP it is?

Assignment :- It is a decision making technique, under this technique, efforts are made to assign certain no. of jobs to certain no. of persons/machines with the objective of cost/time minimization.

ex: "It is / the given problem is converted to minimization assignment problem."

Assignment problem can be solved by Hungarian method, under this method following procedure shall be used:-

where value in matrix is called "cost" [saying that cost is very high, called as "cost"]

Step 1: Deduct least element of each row from all element of the row (Jamke kolumn mein zero ekhotay ye ek se upada hojaye).

Step 2: Now, deduct least element of each column from all the elements of the column. (Sab row operation hojaye: hum, 40 for column, obj is to fill matrix with zero which is not equal to lines of rows of matrix)

Step 3: Now, draw minimum number of lines to cover all zero (either vertical or horizontal). Selection on basis of least zero, other zero on selected row & column will cancel.

Step 4: If no. of lines are equal to order of matrix, then make assignment. If no. of lines are less than order of matrix, then use following procedure:-

→ Least uncovered element shall be deducted from all uncovered elements
→ Least uncovered element shall be added to element at intersection of lines.

→ Other covered element remain unchanged.

→ Now, Again draw minimum, no. of lines to cover all zero.

If no. of lines are equal to order of matrix, then make assignment, otherwise repeat above procedure until number of lines become equal to order of matrix.

If column/row main zero ko square kya hum hain, woh work ko dedenge.

Illustration 10 - Pg 12-20.

Q - 11, 14, 15, 16, 17.

Illustration 4 - Pg 12-40.

If in Q's given product can be made

in 8 hours (day in machine)

with 20 min rest, so effectively machine is running for the 30 min only.

" 5 - Pg 12-90.

" 6 - " 12-12.

" 7 - " 12-13 (matrix only) → Final

" 8 - " 12-15 (matrix).

Special Case in Assignment :-

- **Unbalanced Assignment Problem** - If no. of rows & columns are not equal, then it is called unbalanced assignment problem. It shall be resolved by assigning dummy row/dummy column in assignment matrix. All element in dummy row/column shall be taken "0".

Prohibited Assignment :- If a job cannot be assigned to a particular employee/machine, then it is called prohibited assignment. It shall be resolved by introduction of infinite cost/time ("M") in prohibited cell.

Preferred Assignment :- If a particular job must be assigned to a particular person/machine, then it is called preferred assignment. It shall be resolved by elimination of column & row of preferred assignment.

Maximization Assignment :- If any assignment has objectives to maximise sales/profit, then it is called maximization problem. In such a case, revenue/profit matrix shall be converted into opportunity cost matrix. For such conversion, all element of the matrix shall be deducted from highest element of the matrix.

Multiple Optimum Solution :- If any assignment problem has more than one optimum solution, then it is called multiple optimum solution. It can be judge in final assignment matrix, when two or more row/column have more than one zero in parallel.