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The advanced method for finding optimum solution for transportation problem

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Abstract
In this paper, we are trying to find the optimum solution of a transportation problem and is to minimize the cost. The most attractive feature of this method is that it requires very simple arithmetical and logical calculation, which compared to the existing method an optimal solution and illustrated with numerical example.

Keywords: Transportation, minimization costs, sources supply, demand, proposed method

1. Introduction
A transportation problem is one of the earliest and most important applications of linear programming problem. Which can be applied for different sources f supply to different destination of demand in such a way that the total transportation cost should be minimized. Usually, the initial basic feasible solution of any transportation problem is obtained by using well known methods such as North West Corner Method or Least-Cost Method or Vogel's Approximation Method, and then finally the optimality of te given transportation problem is checked by MODI.
Afterwards many researchers provide many methods to solve transportation problem. Some of the important related works the current research has deal with are: 'Modified Vogel's Approximation Method for Unbalance Transportation Problem', [2] by N. Balakrishnan. 'An Improved Vogel's Approximation method [3] by Serder Korukogu and Serkan Balli., 'A new approach for find an Optimal Solution for Transportation Problems', [6] by Sudhakar VJ et.al
In last few year S. Rekha, *et al*. [5], M. Wali Ullah *et al* [1] and S.M. Abul Kalam [4] developed the method is very helpful as having less computations and also required the short time of period for getting the optimal solution.
In this paper we introduce Method for solving transportation problem which is very simple, easy to understand and helpful for decision making and it gives minimum solution of transportation problem.
The method developed here ensures a solution which is very closer to the optimal solution.

2. Algorithm of Proposed Method
Step 1: Examine whether the transportation problem is balanced or not. If it is balanced then go to next step.

Step 2: Find the difference between maximum and minimum in each row which is called as row penalty and difference between maximum and next maximum in each column which is called as column penalty and write it in the side and bottom.

Step 3: From that select the maximum value. From the selected row/column we need to allocate the minimum of supply/demand in the minimum element of the row or column. Eliminate by deleting the columns or rows corresponding to where the supply or demand is satisfied.

Step 4: If obtained condition in step 3 is contrary, that is if there is tie in maximum value select that value which has least element. If there is tie in the least element then allocate the least element which has minimum supply/ demand.

Step 5: Repeating the step 2 to step 4 until satisfaction of all the supply and demand is met.

Step 6: Now total minimum cost is calculated as sum of the product of cost and corresponding allocate value of supply/demand.

3. Numerical Example

Example 3.1. Illustrate

Table 1

	D$_1$	**D$_2$**	**D$_3$**	**Supply**
S$_1$	4	3	5	9
S$_2$	6	5	4	8
S$_3$	8	10	7	10
Demand	7	12	8	

Solution: since $\Sigma a_i = \Sigma b_j = 27$

The given transportation problem is balanced; therefore exist a basic feasible solution to Proposed Method problem.

Table 2

	D$_1$	**D$_2$**	**D$_3$**	**Supply**	**Row Penalty**
S$_1$	4	3 / 9	5	9	(2) - -
S$_2$	6	5 / 3	4 / 5	8, 5	(2) (2) (2)
S$_3$	8 / 7	10	7 / 3	10	(3) (3) (1)
Demand	7	12 3	8 3		
Column Penalty	(2) (2) (2)	(5) (5) -	(2) (3) (3)		

The transportation cost is:

Z = 3*9 + 5*3 + 4*5 + 8*7 + 7*3 = 139/-

Example 3.2. Illustrate

Table 3

	D$_1$	**D$_2$**	**D$_3$**	**D$_4$**	**Supply**
S$_1$	9	8	5	7	12
S$_2$	4	6	8	7	14
S$_3$	5	8	9	5	16
Demand	8	18	13	3	

Solution : since $\Sigma a_i = \Sigma b_j = 42$

The given transportation problem is balanced; therefore exist a basic feasible solution to Proposed Method problem.

Table 4

	D$_1$	**D$_2$**	**D$_3$**	**D$_4$**	**Supply**	**Row Penalty**
S$_1$	9	8	5 / 12	7	12	(4) (3) (3) -
S$_2$	4 / 8	6 / 6	8	7	14, 6	(4) (2) (2) (2)
S$_3$	5	8 / 12	9 / 1	5 / 3	16, 13	(4) (4) (1) (1)
Demand	8	18	13 1	3		
Column Penalty	(4) - - -	(0) (0) (0) (2)	(1) (1) (1) (1)	(0) (0) - -		

The transportation cost is

Z = 5*12 + 4*8 + 6*6 + 8*12 + 9*1 + 5*3 = 248/-

Comparison of the numerical results

Comparison of the numerical results which are obtain from the example is shown in the following table

Table 5

Method	Example 3.1	Example 3.2
Proposed Method	139	248
North West Corner Rule	150	320
Matrix Minima Method	145	248
VAM	150	248
MODI- Method	139	240

4. Conclusion

The proposed method is an attractive method which is very simple, easy to understand and gives result exactly or even lesser to VAM method. All necessary qualities of being time efficient, easy applicability etc., forms the core of being implemented successfully.

5. References

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