# Transportation Solution with New Algorithm

Khilendra Singh [1], Sanjeev Rajan [2]

[1]Research Scholar, Hindu College Moradabad, Uttar Pradesh, India
[2]HOD, Department of Mathematics, Hindu College, Moradabad, Uttar Pradesh, India
ksdhariwal82@gmail.com, dr.rajansanjeev@gmail.com

**Abstract:** In present work, we have developed the new algorithm for solving the Transportation problem. This useful algorithm is an appropriate solution of Transportation problem faced by common people in their day to day life. By using this algorithm we can find the optimize solution of the given problem. The problem solution is being demonstrated by showing virtual problems and their solutions.

## 1. Introduction

Operations Research is a branch of mathematics, which empower us to decide how to streamline the game-plan in each choice we make. It changes over genuine issue into the scientific model. The indispensable element of task inquire about is to expand a genuine issue into a multidimensional on the grounds that administration issues and their answers have outcomes in a few fields, for example, human, monetary, political and social fields.

It is a problem-solving technique. It includes both science and Mathematical techniques used by the science part of operation research for solving decision problems. And the skill of operation research team to develop good image with those supplying information and those who have to apply the recommended solutions is the art part of operation research. It is significant that both the science and the art parts of the operation research are understood suitably for problem solving. It enables us to make decision which maximize the interest of the organization, therefore, it is a decision making device for the organizations.

Decision-making in today's social and business environment has become a difficult task. High costs of machinery, materials, labours, competitive pressures and so many dissimilar economic, social as well as political factors and viewpoints, greatly increase the complexity of managerial decision-making. Knowledge and technology are changing drastically and are always giving rise to problems with little or no precedents. Well-structured problems are usually optimized at the operational level of organizations, and enlarge the attention which is now focused on broader planned and strategic issues. In order to effectively address the arising problems and to offer leadership in the advancing global age, decision-makers are unable to make decisions by simply applying their personal experiences, guesswork or intuition, because the consequences of incorrect decisions gives the result which prove to be serious and costly. Hence it is important for the decision maker to understand the applicability of quantitative method for decision making. For example, in going the wrong markets produces the wrong products and services will be badly chosen as a result it may lead to disastrous consequences for organizations.

The TPP is mainly a linear programmed. Transportation problems are solved by simplex algorithm but however it is time consuming and lengthy. So in transportation problems there is a model with simple calculation which can optimize the cost of transporting products from number of sources to different destinations. Therefore transportation problem is a transshipment problem which deals with transportation of product manufactured at different plants or factories ( supply or origins ) to number of different warehouses (demand or destinations).

The main objective was to transport commodity from one source to another destination in such a way that it minimize transportation cost and on the same way it helps in satisfying the requirement of destinations. Since there is a Allocation method which is applied to a lot of very observe problems.

A big business has industrial unit at $F_1$, $F_2$ and $F_3$ which provide to storehouses at $W_1$, $W_2$ and $W_3$. Monthly industrial unit capability are 56, 82 and 77 items respectively. Monthly industrial unit demand are 72, 92 and 41 items respectively. Items of transporting cost (in rupees) are as follows:

There are five methods to find the solution for balanced TPP.
  I.    NWC method
 II.    LCE method
III.    VA method

IV.   RM method
V.   CM method

We are going to illustrate the given problem by old method.

**Initial possible solution finalize by the VA method**

Same here we have to make the given matrix balanced. Then using the Vogel's steps we finalize it into the below table:

Table 1: Transportation Problem

|  | $W_1$ | $W_2$ | $W_3$ | Supply |
|---|---|---|---|---|
| $F_1$ | 4 | 8 | 8 | 56 |
| $F_2$ | 16 | 24 | 16 | 82 |
| $F_3$ | 8 | 16 | 24 | 77 |
| Demand | 72 | 92 | 41 | |

Table 2: Solution by VAM

|  | $W_1$ | $W_2$ | $W_3$ | $W_4$ | Supply |
|---|---|---|---|---|---|
| $F_1$ | 4 | 8(56) | 8 | 0 | 56 |
| $F_2$ | 16 | 24(31) | 16(41) | 0(10) | 82 |
| $F_3$ | 8(72) | 16(5) | 24 | 0 | 77 |
| Demand | 72 | 92 | 41 | 10 | 215 |

Total cost = (8*56)+(24*31)+(16*41)+(16*5) +(8*72)+(0*10) = 2504

**New Alternative Technique**

Here we discussed, a new alternative technique for transportation problem. The following method must be conducted as:

**Steps:**

I.   At first check whether the given matrix is balanced or not. If the matrix is unbalanced i.e if the total availabilities is not equal to the total, requirements then we balanced it by adding a artificial row or column as required to make availability equal to the requirement. So the TP costs in this row or column will assigned to nil.

II.   Choose the best element that is to for minimizing problems to the least cost and increasing profit to maximum cost. so, this step can be finished by electing the superlative contestant (transportation cost) in each row as well as in column.

III.   Discover the combination by determining one contestant for every row and column; this should be finished through starting from the row that has slightest contestant.

IV.   Compute and evaluate the summations of constant for each arrangement. This is to find out the supreme arrangement that gives best possible solution.

By using the above steps we finalize the example in following table.

Table 3: Solution by Alternative Technique

|  | $W_1$ | $W_2$ | $W_3$ | $W_4$ | Supply |
|---|---|---|---|---|---|
| $F_1$ | 4 | $(8)_{56}$ | 8 | 0 | 56 |
| $F_2$ | 16 | $(24)_{31}$ | $(16)_{41}$ | 0 | 82 |
| $F_3$ | $(8)_{72}$ | $(16)_5$ | 24 | 0 | 77 |
| Demand | 72 | 92 | 41 | 10 | 215 |

Total cost = (8*72) + (8*56) + (16*5) + (24*31) + (16*41) = 2504

**Conclusion:**

By using the new alternative method we found the optimize solution 2504. Our solution is similar to the old method solution. Alternative method gives the fast optimize solution with compare the old method.

**References:**
1.   Adlakha, V. & Kowalski, K., "Alternative solution analysis for transportation problem", Journal of Business & Economic Research 11, P: 41-49, (2009).
2.   Chinnam Reddy, "Research methodology and operations research", Dorling Kindenslery (India) Pvt. Ltd. P: 388-389, (2011).

3.  Col. D.S Cheema (Retd.), "Operations research", Laxmi Publications Pvt. Ltd. P: 1-2, (2013).
4.  K Sharma, " Operations Research Theory And Application", Macmillan Publishers India Limited, P: 2, (2009).
5.  Sivarethinamohan, "Operation Research", Tata Mc Graw- Hill Publishing Company Limited, P: 188, (2008).
6.  Sharma, R.R.K. and K.D. Sharma, " A new dual based procedure for the transportation problem", European Journal of Operational Research, 122, P: 611-624, (2000).
7.  Shodhgnga, Inflibnet.ac.in/bitstream/10603/3970 by Ms Gaglani (2012).

6/22/2018