

# Implications of Advanced Method

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**Abstract:** This paper discusses the implications of Advanced method for finding the optimal solution of transportation problem. Advanced method<sup>[2]</sup> does not give a solution nearly comparable to MODI method as claimed by Reena G Patel and P.H.Bathwala. In most of the transportation problems difference between the transportation costs given by both the methods are very high.. MODI method proved itself effective invariably in all cases till now. Even in most of the cases VAM gives a better feasible solution than Advanced Method. Two counter examples are given in this paper to prove this point.

**Keywords:** VAM , Transportation problem

## 1. Introduction

As by Hamdy.A.Taha<sup>[3]</sup>, Transportation problem is a special type of LPP where the objective is to minimize the cost of distributing a commodity from fixed number of sources to a fixed number of destinations. Let there are m sources  $S_1, S_2, \dots, S_m$  and n destinations  $D_1, D_2, D_3, \dots, D_n$ .

Transportation problem can be represented mathematically as LPP as follows

Minimize :  $Z =$

$$\sum_{i=1}^m \sum_{j=1}^n c_{ij} x_{ij}$$

Subject to

$$\sum_{j=1}^n x_{ij} \leq a_i, \quad i=1,2,3,\dots,m$$

$$\sum_{i=1}^m x_{ij} \geq b_j, \quad j=1,2,3,\dots,n$$

$$x_{ij} \geq 0 \text{ for all } i, j$$

$a_i$  = quantity of commodity available at origin  $i$

$b_j$  = requirement of commodity at destination  $j$

$c_{ij}$  = cost of transportation of one unit of commodity from  $i$ th source to  $j$ th destination .

$x_{ij}$  = number of units of commodity to be transported from  $i$ th source to  $j$ th destination

**Total transportation cost**

$$8*10+7*40+9*17+7*23+9*15+11*15$$

=Rs. 974

**Solution of transportation problem by VAM is represented in the following table**

Sources	D	E	F	G	Supply
A	8 <sub>(25)</sub>	10 <sub>(2)</sub>	7	6 <sub>(23)</sub>	50
B	12	9	4 <sub>(40)</sub>	7	40
C	9	11 <sub>(30)</sub>	10	8	30

Requirements 25 32 40 23 120

Total transportation cost

$$=8*25+10*2+6*23+4*40+11*30$$

=Rs. 848

**Solution of problem by MODI method is represented in the following table**

Sources	D	E	F	G	Supply
A	8 <sub>(25)</sub>	10 <sub>(2)</sub>	7	6 <sub>(23)</sub>	50
B	12	9	4 <sub>(40)</sub>	7	40
C	9	11 <sub>(30)</sub>	10	8	30

Requirements 25 32 40 23 120

Total

$$\text{cost} = 8*25 + 10*2 + 6*23 + 4*40 + 11*30 = \text{Rs. } 848$$

## 2. Numerical Examples

**Example 1.** Transportation model of problem is given below

Sources	Destinations				supply
	D	E	F	G	
A	8	10	7	6	50
B	12	9	4	7	40
C	9	11	10	8	30

Requirement 25 32 40 23 120

**Solution of the problem by Advanced method is represented in the following table**

Sources	Destinations				Supply
	D	E	F	G	
A	8 <sub>(10)</sub>	10	7 <sub>(40)</sub>	6	50
B	12	9 <sub>(17)</sub>	4	7 <sub>(23)</sub>	40
C	9 <sub>(15)</sub>	11 <sub>(15)</sub>	10	8	30

Requirement 25 32 40 23 120

**Example 2:** Transportation model of a problem is given below

Source	Destinations				Supply
	D1	D2	D3	D4	
S1	65	45	35	75	150
S2	60	55	20	80	200
S3	60	50	30	85	130
Req.	110	120	150	100	480

**Solution of the problem by Advanced method is represented in the following table.**

source	Destinations				Supply
	D1	D2	D3	D4	
S1	65	45	35 <sub>(50)</sub>	75 <sub>(100)</sub>	150
S2	60	55 <sub>(100)</sub>	20 <sub>(100)</sub>	80	200
S3	60 <sub>(110)</sub>	50 <sub>(20)</sub>	30	85	130
Req.	110	120	150	100	480

Total transportations cost

$$=35*50+75*100+55*100+20*100+60*110+50*20$$

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=Rs.24,350

Solution of the problem by VAM is represented in the following table

Source	Destinations				Supply
	D1	D2	D3	D4	
S1	65	45 <sub>(120)</sub>	35	75 <sub>(30)</sub>	150
S2	60	55	20 <sub>(150)</sub>	80 <sub>(50)</sub>	200
S3	60 <sub>(110)</sub>	50	30	85 <sub>(20)</sub>	130
Req.	110	120	150	100	480

Total transportation cost=  
 $45 \times 120 + 75 \times 30 + 20 \times 150 + 80 \times 50 + 60 \times 110 + 85 \times 20$   
 =Rs22,950

Solution of the problem by MODI method is represented in the following table

Source	Destinations				Supply
	D1	D2	D3	D4	
S1	65	45 <sub>(100)</sub>	35	75 <sub>(50)</sub>	150
S2	60	55	20 <sub>(150)</sub>	80 <sub>(50)</sub>	200
S3	60 <sub>(110)</sub>	50 <sub>(20)</sub>	30	85	130
Req.	110	120	150	100	480

Total transportation cost=  
 $45 \times 100 + 75 \times 50 + 20 \times 150 + 80 \times 50 + 60 \times 110 + 50 \times 20 = \text{Rs } 22,850$

### 3. Result Analysis

Above examples contradicts the claim of Reena.G.Patel and P.H.Bhathwala. The comparison table of the solutions given by Advanced,VAM and MODI methods is given below.

Methods	Total transportation cost(in Rs)	
	Example1	Example2
Advanced	974	24,350
VAM	848	22,950
MODI	848	22,850

### 4. Conclusion

Above noted study proves that Advanced method is not comparable to MODI method for finding optimal solution of a transportation problem.

### References

- [1] Dantzig G.B ,Linear programming and extentions. Princeton university press,Princeton,NJ,1963.
- [2] Patel.Reena.G,Bhathwala.P.H , Advanced Method for the Optimum solution of a transportation problem, International Journal of Science and Research,2319-7064,2015
- [3] Hamdy A.T. , operations Research: An introduction, 8<sup>th</sup> edition, Pearson Prentice Hall,New Delhi,2007.
- [4] Hadley.G,Linear Programming,Narosa Publishing House,6<sup>th</sup> edition,2006.