

# Ramifications of SS Method

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**Abstract:** This paper discusses about ramifications of SS method as propounded by A. Seethalakshmy and Dr. N. Srinivasan (2016) [2] SS method does not give optimal solution in some transportation problems whereas MODI method [1] proves itself effective invariably in all cases. Two counter examples are given in this paper to prove this assertion.

**Keywords:** Transportation problem, optimal solution, transportation cost, SS method, MODI method

## 1. Introduction

As by Hamdy.A.Taha[3], Transportation problem deals with transportation of single commodity from fixed number of sources to a fixed number of destinations, given the level of supply at each source, amount of demand at each destination and the unit transportation cost of the commodity from each source to each destination. The objective of the transportation problem is to determine the amount to be transported from each source to each destination, such that the total transportation cost is minimized.

Transportation problem can be represented as a LPP as follows

Minimize :  $Z =$

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

Subject to

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

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

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

$i=1,2,3,\dots,m$  is the set of sources.

$J=1,2,3,\dots,n$  is the set of destinations.

$a_i$  = availability of material at  $i^{\text{th}}$  source.

$b_j$  = requirement of material at  $J^{\text{th}}$  destination

$c_{ij}$  = cost of transportation of one unit of material from  $i^{\text{th}}$  source to  $j^{\text{th}}$  destination.

$x_{ij}$  = number of units of material to be transported from  $i^{\text{th}}$  source to  $j^{\text{th}}$  destination.

## 2. Numerical Examples

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

Sources	Destinations				supply
	D	E	F	H	
A	8	8	9	4	800
B	5	8	5	11	500
C	8	9	7	3	900

Requirements 400 350 300 250 900 2200

**Solution of transportation problem using MODI method**

Optimal solution of the problem by MODI method is represented in the following table

	Destinations					supply
	D	E	F	G	H	
A	8	8 <sub>(350)</sub>	9	4	3 <sub>(450)</sub>	800
B	5 <sub>(400)</sub>	8	5 <sub>(100)</sub>	11	6	500
C	8	9	7 <sub>(200)</sub>	3 <sub>(250)</sub>	3 <sub>(450)</sub>	900

Req. 400 350 300 250 900

**Total transportation cost**

$$8*350+3*450+5*400+5*100+7*200+3*250+3*450$$

=Rs. 10,150

**Solution of transportation problem using the SS method**

Optimal solution of transportation problem by SS method is represented in the following table

Source	Destinations					Supply
	D	E	F	G	H	
A	8	8	9	4	3 <sub>(800)</sub>	800
B	5 <sub>(400)</sub>	8	5 <sub>(100)</sub>	11	6	500
C	8	9 <sub>(350)</sub>	7 <sub>(200)</sub>	3 <sub>(250)</sub>	3 <sub>(100)</sub>	900
Req.	400	350	300	250	900	2200

Total transportation cost

$$=3*800+5*400+5*100+9*350+7*200+3*250+3*100$$

=Rs. 10,500

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

Source	Destinations				Supply
	D1	D2	D3	D4	
S1	6	1	9	3	70
S2	11	5	2	8	55
S3	10	12	4	7	90
Req.	85	35	50	45	215

Optimal solution of the problem by MODI method is represented in the following table.

Source	Destinations				Supply
	D1	D2	D3	D4	
S1	6 <sub>(40)</sub>	1 <sub>(30)</sub>	9	3	70
S2	11	5 <sub>(5)</sub>	2 <sub>(50)</sub>	8	55
S3	10 <sub>(45)</sub>	12	4	7 <sub>(45)</sub>	90
Req.	85	35	50	45	215

Total transportation cost

$$=6*40+1*30+5*5+2*50+10*45+7*45$$

=Rs.1,160.

Optimal solution of the problem by SS method is represented in the following table.

	<b>Destinations</b>				
Source	D1	D2	D3	D4	Supply
S1	6	1 <sub>(35)</sub>	9	3 <sub>(35)</sub>	70
S2	11	5	2 <sub>(50)</sub>	8 <sub>(5)</sub>	55
S3	10 <sub>(85)</sub>	12	4	7 <sub>(5)</sub>	90
Req.	85	35	50	45	215

Total transportation cost  
 $= 1*35 + 3*35 + 2*50 + 8*5 + 10*85 + 7*5$   
 $= \text{Rs.} 1,165.$

### 3. Result Analysis

Above examples show that in some cases optimal solution is only given by MODI method and not by SS method. The comparison table of the solutions given by both the methods is given below.

Methods	Total Transportation Cost	
	Example 1	Example 2
MODI	Rs. 10150	Rs. 1160
SS	Rs. 10500	Rs. 1165

### 4. Conclusion

Above noted study proves that SS method cannot be an alternative to MODI method for finding optimal solution of a transportation problem.

### References

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