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Modified North-West Corner Method for the Optimal Solution for Transportation Problems

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Abstract: A new method Modified North West Corner (M.N.W.C.M) has been developed for initial feasible solution (I.B.F) with consequence number of entries needed to operate the transportation, which is used to obtain optimal solution. The transportation problem is a very important class of model in linear programming. it is related with the condition where commodity from many ways or sources is transported to various destinations with the main purpose to minimize the transportation time/steps. This will specially purpose at searching or looking for the best and cheapest way on supplier are using to satisfy demand at main points. This is the way of implying that a changeable cost of shipping products from dristibuter to demand points will be adjusted. When we compare modified N.W.C.M and N.W.C.M. The results are same but my new developed method is more powerful than N.W.C.M according to the time point of view.

Keywords: Optimization Techniques, Transportation Problems, North-West Corner Method.

1. INTRODUCTION

Managerial decisions are made with a best and powerful tool like linear programming. The techniques involved in Linear Programming may be utilized to solve wide range of problems which arise in government, business, hospitals, industries, corporate sectors, libraries, etc. Linear Programming helps us to allocate the available limited resources for various competing behavior to achieve the desired objectives. The decision making capabilities of Linear Programming are verified in a range of fields like as finance, production, research, marketing, personal management, development and determination of optimal transportation schedules for product mix.

In linear programming, the oldest application is transportation. (Hitch cock 1941) originally developed the basic transportations problem. The study focused on the formulation of transportation problem as linear programming problem solved through the application of four methods which are explored by (Atoum .2009). (Guass 1990) has described that important part of the logististics supply chains are the T.P. A single commodity from a number of sources to a number of destinations are problems basically deals with the determination of a cost plan for transportation. North-west corner method give the quick solution. But computation take short time and give the bad solution, so it is very far from optimal solution (Taghrid 2009). Researchers discuss how to minimize the total transportation cost by satisfying the supply and demand restrictions also determined the amounts transported from each source to each sink (Hakim 2012). (transportation problems are also using in simulation of more real life problems. Further the mainly aim is to find the best and cheapest way on how supply are used to satisfy demand at main points.(Rekha (2013).

(Awell 2014) tested the innovation efficiency by North-west corner rule .Further the feasible solution of a transportation problems to minimize the cost by North-west corner rule has been discussed by (Albert 2014).

2. GENERAL FORM OF TRANSPORTATION PROBLEMS.

The general transportation problem shape in ‘’m’’ sources in ‘’n’’ destinations can be represented as:

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Transportation Tableau

Sources	Destinations					Supply
	1	2	3	...	N	
1	C_{11} X_{11}	C_{12} X_{12}	C_{13} X_{13}	. . . . . .	C_{1n} X_{1n}	S_1
2	C_{21} X_{21}	C_{22} X_{22}	C_{23} X_{23}	. . . . . .	C_{2n} X_{2n}	S_2
3	C_{31} X_{31}	C_{32} X_{32}	C_{33} X_{33}	. . . . . .	C_{3n} X_{3n}	S_3
. . .	. . .	. . .	. . .	. . . . . .	. . .	. . .
M	C_{m1} X_{m1}	C_{m2} X_{m2}	C_{m3} X_{m3}	. . . . . .	C_{mn} X_{mn}	S_m
Demand d_i	d_1	d_2	d_3	. . . . . .	d_n	Total

North-west corner method.

The algorithm for North-west corner methods are:

1. Delete the supply (source) power at each row, first move down to the next row.
2. Delete the demand (destination) suppliers of each column first move to the right of the next column.
3. Continue the same method when all supply and demand requirements has been exhausted.

Example No. 01. Consider the transportation problems.To find the feasible solution. **(Table. 1).**

					Supply
A	3	1	7	4	300
B	2	6	5	9	400
C	8	3	3	2	500
Demand	250	350	400	200	

Solution:

250 3	1	7	4	~~300~~ 50
2	6	5	9	400
8	3	3	2	500
~~250~~	350	400	200	

250 1	7	4	~~50~~
6	5	9	400
3	3	2	500
~~350~~ 300	400	200	

300 6	5	9	~~400~~ 100
3	3	2	500
~~300~~	400	200	

100 5	9		~~100~~
3	2		500
~~400~~ 300	200		

300 3	2		~~500~~ 200
~~300~~	200		

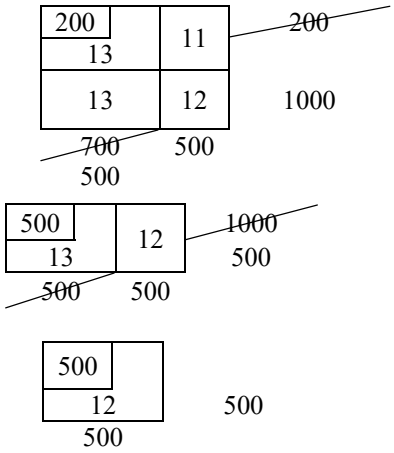
300 2			200
200			

$\sum CiXi = 2x200+3x300+5x100+6x300+1x50+3x250 = 4400$

Table No.2

				Supply
A	14	13	11	1200
B	13	13	12	1000
Demand	1000	700	500	

A	100 14	13	11	~~1200~~ 200
B	13	13	12	1000
	~~1000~~	700	500	



∑CiXi= 12x500+13x500+13x200+14x1000=29100

3. MODIFICATION IN NORTH-WEST CORNOR METHOD (NWCM)

Following steps will be used to get the feasible solution.

a. Select the west-north (lower right hand) cornor cell of the transportation table, allocate units according to supply and demand .

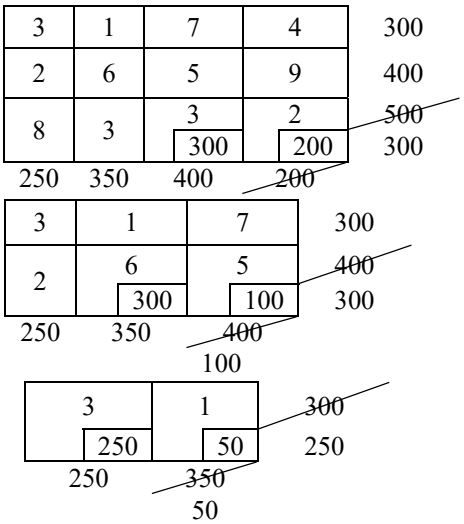
b. Taking the difference between demand and supply in magnitude, i.e. |demand – supply |. Exhaust/delete that row and column. Persue last remaing supply or demand and continue same process until the demand and supply value becomes equal.then minimum cost by proposed algorithm is defined as

$\sum_{i=1}^{m}$ { $C_iX_i + C_{i-1}X_i$ } where $\sum_{i=1}^{m}$ $C_iX_i = a_i$ i= 1,2,3…

Example : Solve by modified N.W.C. Method , to find the feasible solution. (Table. 1).

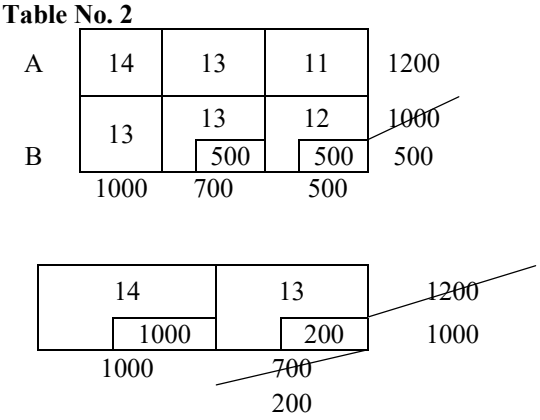
					Supply
A	3	1	7	4	300
B	2	6	5	9	400
C	8	3	3	2	500
Demand	250	350	400	200	

Solution:



∑CiXi+Ci-1Xi=
1x50+3x250+5x100+6x300+2x200+3x300
50+750+500+1800+400+900= 4400

Table No. 2



∑CiXi= 12x500+13x500+13x200+14x1000= 29100

Table: A comparison of the methods N.W.C.M and M.N.W.C.M

No. of Problems	Initial basic feasible solution	Value of the objective function	Minimum value(cost)	No.of iterations/ steps
Example No. 1	N.W.C.M	4400	Same result	06
Example No. 1	M.N.WC.M	4400	Same result	03
Example No. 2	N.W.C.M	29100	Same result	04
Example No. 2	M.N.WC.M	29100	Same result	02

4. CONCLUSION

In this paper, we have proposed a (M.N.W.C.M) to solve transportation problems, because of its wide applicability in different area. Here , it refers to select the best destruction of cost or time.

This method obtained the optimal solution with a minimum computation time. As well as, using (M.N.W.C.M) will reduces the complexity with a simple and a clear solution manner which is can be easily used on different areas for optimization problems.

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