Left Maximum Minimum Cost Ideal Process -Secure and Unhinged Grid in Haze Computing

S. Janani[a], K. Thiagarajan[b], N. Suriya Prakash[c]
[a b] Department of Mathematics, K. Ramakrishnan College of Technology, Trichy, Tamil Nadu, Indi
[c] Aptean India Pvt. Ltd, Bangalore, Karnataka, India
[a] jananis0502@gmail.com, [b]vidhyamannan@yahoo.com, [c] prakashsuriya@gmail.com

Article History: Received: 11 January 2021; Revised: 12 February 2021; Accepted: 27 March 2021; Published online: 28 April 2021

Abstract: In this article, proposed method namely Maximum Minimum LeftAllotment method is applied to seek the feasible solution with respect to Cost Optimization from the basic feasible solution set for transportation problems. The proposed algorithm is a different way to obtain the feasible (or) may be optimal (for some extant) solution without anxiety of degeneracy condition.

Keywords: Assignment problem, Degeneracy, Left,Maximum, Minimum, Optimum Cost, Pay off Matrix (POM), Pivot element, Transportation problem

1. Introduction

In transport departments and travelers are facing some problems to detect the cost of transportation. Now a days many proposals and procedures are developed in this connections in linear programming problems mainly reduce the cost [3]. Particularly from warehouses and Godowns articles will be transported source place to designated places with cheap cost[1], [2]. The cost of distribution from a source to a destination is directly comparative to the number of units shipped [1] [8], [9].

In Computer Science Engineering formally some techniques were used in internet connections and intranet connections with minimum expenditure. This achievement achieved by an experimental test with genuine ideas of applied Operation Research [5].

So many methods are available to find the minimum cost for the transportation in logistics and supply chain management [6], [7]. Also the cost minimization for the medical management has been discussed widely along with different algorithms in effective manner [4].

2. Procedure:

Left Maximum Minimum Allotment (LMxMiA):

Step 1: Create the Transportation table (TT) for the given pay off matrix (POM).

Step 2: Choose the maximum element from givenPOM.

Step 3: Supply the maximum demand for the minimum component lies in the left side of the chosen maximum componentand delete the corresponding row (or) column.

Step 4: Select the next maximum component from the remaining rows and columns in Newly Constructed Transportation Table (NCTT) and repeat the step 2 & 3 until degeneracy condition satisfied.

Note: If the problem is notbalanced, make the problem as balanced by adding dummy zero row or dummy zero column in the given transportation table, then consider the allotment for the dummy zero row or dummy zero column in end iteration.

Example 1: Consider the following balanced pay off matrix to minimizethe cost.

	D_1	D_2	D_3	D_4	D_5	Supply
S_1	3	4	6	8	9	20
S_2	2	10	1	5	8	30
S_3	7	11	20	40	3	15
S_4	2	1	9	14	16	13
Demand	40	6	8	18	6	78

Table 1

By applying the proposed algorithm, we get

Step 1: The maximum cost in the following table no. 1.1is 40 shaded to state the pivotelement. Allot the maximum possible demand of 8 units which lies in column 3, according to the minimum cost 1 in two various columns namely 2 and 3,by the procedure.

	D_1	D_2	D_3	D_4	D_5	Supply
S_1	3	4	6	8	9	20
S_2	2	10	1 [8]	5	8	22
S_3	7	11	20	40	3	15
S_4	2	1	9	14	16	13
Demand	40	6	0	18	6	70

Table 1.1

Step 2: The next maximum cost in this following table no 1.2is 40 to be selected to state the pivot element.By the procedure 1the maximum possible demand 6 units must beallottedtogether with minimum cost 1 in column 2.

	D_1	D_2	D_4	D_5	Supply
S_1	3	4	8	9	20
S_2	2	10	5	8	22
S_3	7	11	40	3	15
S_4	2	1 [6]	14	16	7
Demand	40	0	18	6	64

Table 1.2

Step 3: The next maximum cost in this following table no 1.3 is 40 to be certain to state the pivot element. By the procedure 1the maximum possible demand 22 units must be chosen composed with minimum cost 2 in column 1.

	D_1	D_4	D_5	Supply
S_1	3	8	9	20
S_2	2 [22]	5	8	0
S_3	7	40	3	15
S_4	2	14	16	7
Demand	18	18	6	42

Table 1.3

Step 4: The next maximum cost in this following table no 1.4 is 40 to be particular to state the pivot element. By the procedure 1the maximum possible demand 7 units must be selectedtogether with minimum cost 2 in column 1.

	D_1	D_4	D_5	Supply
S_1	3	8	9	20
S_3	7	40	3	15
S_4	2 [7]	14	16	0
Demand	11	18	6	35

Table 1.4

Step 5: The next maximum cost in this following table no 1.5 is 40 to be selected to state the pivot element. By the procedure 1the maximum likely demand 11 units must be allottedtogether with minimum cost 3 in column 1.

	D_1	D_4	D_5	Supply
S_1	3 [11]	8	9	9
S_3	7	40	3	15
Demand	0	18	6	24

Table 1.5

Step 6: The next maximum cost in this following table no 1.6 is 40 to be selected to state the pivot element. By the procedure 1the maximum likely demand 9 units must be allottedtogether with minimum cost 8 in column 1.

	D_4	D_5	Supply
S_1	8 [9]	9	0
S_3	40	3	15
Demand	9	6	15

Table 1.6

Step 7:

	D_4	D_5	Supply
S_3	40 [9]	3 [6]	0
Demand	0	0	0

Table 1.7

Supply the maximum possible demand 9 units in (1, 1) and 6units in (1, 2) which leads to the solution satisfying all the conditions.

Step 8: The resulting initial feasible solution is given below.

	D_1	D_2	D_3	D_4	D_5	Supply
S_1	3 [11]	4	6	8 [9]	9	20
S_2	2 [22]	10	1 [8]	5	8	30
S_3	7	11	20	40 [9]	3 [6]	15
S_4	2 [7]	1 [6]	9	14	16	13
Demand	40	6	8	18	6	78

Table 1.8

OptimumCost:

S	1	1	2	2	3	3	4	4
D	1	4	1	3	4	5	1	2
Cost	33	72	44	8	360	18	14	6
							Optimum Cost	555

Table 1.9

Example 2: Consider the following balanced pay off matrix to minimize the cost.

	D_1	D_2	D_3	D_4	D_5	Supply
S_1	2	11	10	3	7	4
S_2	1	4	7	2	1	8
S_3	3	9	4	8	12	9
Demand	3	3	4	5	6	21

Table 2

The resulting initial feasible solution is given below.

	D_1	D_2	D_3	D_4	D_5	Supply
S_1	2 [1]	11	10	3 [3]	7	4
S_2	1 [2]	4	7	2	1 [6]	8
S_3	3	9 [3]	4 [4]	8 [2]	12	9
Demand	3	3	4	5	6	21

Table 2.1

OptimumCost:

S	1	1	2	2	3	3	3
D	1	4	1	5	2	3	4
Cost	2	9	2	6	27	16	16
						Optimum Cost	78

Table 2.2

Example 3: Consider the following balanced pay off matrix to minimize the cost.

	D_1	D_2	D_3	D_4	Supply
S_1	10	30	50	10	7
S_2	70	30	40	60	9
S_3	40	8	70	20	18
Demand	5	8	7	14	34

Table 3

The resulting initial feasible solution is given below.

	D_1	D_2	D_3	D_4	Supply
S_1	10 [5]	30	50	10 [2]	7
S_2	70	30	40 [7]	60 [2]	9
S_3	40	8 [8]	70	20 [10]	18
Demand	5	8	7	14	34

Table 3.1

OptimumCost:

S	1	1	2	2	3	3
D	1	4	3	4	2	4
Cost	50	20	280	120	64	200
					Optimum Cost	734

Table 3.2

Comparison with existed methods:

Comparison with North West Corner method (NWC):

EXAMPLE	NWC	LMxMiA	ACCURACY %
1	970	734	132.15
2	153	78	196.15
3	878	555	158.20
Average accuracy			162.17

Table 4.1

Comparison with Least Cost Method (LCM):

EXAMPLE	LCM	LMxMiA	ACCURACY %
1	814	734	110.90
2	78	78	100.00
3	555	555	100.00
Average accuracy			103.63

Table 4.2

Comparison with Vogal's Approximation Method (VAM):

EXAMPLE	VAM	LMxMiA	ACCURACY %
1	734	734	100.00
2	68	78	87.18
3	267	555	48.11
Average accuracy			78.43

Table 4.3

3. Results and Discussion:

Overall Accuracy	
With NWC	162.17
With LCM	103.63
With VAM	78.43
Average accuracy	114.74

Table 5

The proposed method gives14.74% more accuracy in optimal feasible solution than the existed Least Cost Optimization Method.

4. Acknowledgement

The authors express their gratitude to Dr. PonnammalNatarajan, Former Director of Research, Anna University, Chennai, India..

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