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A New Approach to Study Transportation Problem Using South West Corner Rule

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Abstract: **In this paper we try to solve a problem of transporting goods for a pharma linguistics company from one place to another at a minimum cost by south west corner rule. This is an emerging trend in operations research in which we can solve the transportation problems in a unique way.**

Key words: **Transportation problem, south west corner rule, optimality**

I. INTRODUCTION

Operations research is a statistical tool which was developed during the World War II by the military management of the United Kingdom. A large group of scientists were called from all over the country to give a research plan to analyze the situation and develop a strategy to meet the requirements of the war. After the World War II these techniques were applied to various fields .Operations research was developed as a science. In today's world these techniques are applied in each and every field to meet the requirements to solve a problem.
Transportation problem is a special case of Operations research. In Transportation we deal with the problems regarding the shipment of the goods from one place to another i.e. source to the destinations .Here we try to minimize the total cost allocated for the transportation of the goods. Transportation problems are solved in two steps

Step 1: Finding an Initial Basic Feasible Solution
Step 2: Testing optimality of the solution taken from Step-1

II. MATHEMATICAL FORMULATION

In the Transportation algorithm we use the following
i) u_i-----Represents the sources from which the goods are to be shipped.
ii) v_j ------Represents the destinations to which the goods are to be transported.

iii) a_{ij}-----Represents the cost associated to transfer a good from u_i to v_j.

iv) It is assumed that the supply at the source and the demand at the destination are equal.

III. INITIAL BASIC FEASIBLE SOLUTION

It is a solution which satisfies the initial conditions and generates m+n-1 occupied cells.

IV. OPTIMAL SOLUTION

The Initial Basic Feasible Solution is further modified to minimize the total cost and that solution is called as optimal solution.

V. SOUTH WEST CORNER RULE

The steps involved in the south west corner rule are stated as follows

Step 1: Construct the transportation table for the given transportation problem.

Step 2: Select the south west corner cell(left hand corner) of the transportation table.

Step 3: Allocate as many units as possible to the selected cell i.e. minimum (supply, demand) at this cell and adjust the supply and demand by subtracting the allocated amount.

Step 4:a) If the supply for the last row is exhausted then move up in the first column and go to step 3
b) If the demand for the first column is satisfied then move horizontally to the next cell in the same row and go to step 3.

Step 5: If both row and column tend to zero simultaneously then arbitrarily cross out only one row or column and leave the other column or row.

Step 6: Repeat the steps 3 to 5 until all the allocations are made i.e. until the supply meets demand.

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Step 7: Check for m+n-1 occupied cells and calculate the transportation cost.

VI.PROBLEM

In this problem we are giving the example of a Siri pharma Company which transports medicines from its various branches in Hyderabad to various places in Telangana state. The distances to various places are given in (Kms) is given in the table 1

Table 1:

Place	Distance
Medak	81
Warangal	154
Khammam	210
Bhadrachalam	314

We use the following codes for the destinations as D1 for Medak, D2 for Warangal, D3 for Khammam, D4 for Bhadrachalam.

Transportation cost for one carton from different branches to different destinations is displayed in the table 2.We use the code names as S1,S2,S3,S4,S5 for the sources i.e. the different branches of the Siri Pharma agency.

Table 2:

Source	Destination			
	D1	D2	D3	D4
S1	120	200	340	520
S2	230	550	430	210
S3	450	125	870	190
S4	340	700	640	250
S5	520	440	550	560

Note: The transportation cost of different suppliers to the same destination is different due to their own policies.

Table 3 shows the quantity that they can supply for a year

Table 3:

Supplier	Quantity Available
S1	4550
S2	8250
S3	7000
S4	6500
S5	2650

Table 4 shows the total demand of the destinations D1, D2, D3, and D4 from these suppliers during that year

Table 4:

Destination	Demand
D1	8000
D2	6750
D3	10000
D4	4200

VII. FORMULATING THE MODEL

Source	Distance				Availability
	D1	D2	D3	D4	
S1	120	200	340	520	4550
S2	230	550	430	210	8250
S3	450	125	870	190	7000
S4	340	700	640	250	6500
S5	520	440	550	560	2650
Demand	8000	6750	10000	4200	28950

Here we can observe that the supply and demand are equal this is the case of a balanced transportation problem. Now let us proceed to solve this problem using the south west corner rule

VIII. INITIAL BASIC FEASIBLE SOLUTION USING SOUTH WEST CORNER RULE

Source	Distance				Availability
	D1	D2	D3	D4	
S1	120	200	340 350	520 4200	4550
S2	230	550	430 8250	210	8250
S3	450	125 5600	870 1400	190	7000
S4	340 5350	700 1150	640	250	6500
S5	520 2650	440	550	560	2650
Demand	8000	6750	10000	4200	28950

Total Transportation cost is
340x350+520x4200+430x8250+125x5600+870x1400+340x5350+700x1150+520x2650=11770500

IX. ACKNOWLEDGMENT

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X.CONCLUSION

This is a new approach to solve the transportation problems .IBFS will be very nearer when compared with other methods.

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