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# Implication of Advanced Vogel Approximation Method

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**Abstract:** ***The study in this paper is to discuss about advanced Vogel approximation method (AVAM) which does not always give better feasible solution than Vogel's approximation method(VAM). As by V.K.Das, 'M.A.babu, A.R.Khan, and M.S.Uddin(2015) It is shown that AVAM is more effective than VAM and gives solution nearer to optimal solution more than VAM. In the end a counter example is given to prove my claim.***

**Keywords:** AVAM, VAM, Feasible solution, optimal solution, transportation problem

## 1. Introduction

Transportation problem is special types of linear programming problem where the goal is to minimize the total transportation cost.In general, it is concerned with distributing any single commodity from any group of supply centre, called sources, to any group of receiving centre, called destination. All destinations can receive its demand from one or more sources. Each sources has a fixed supply of unites, where the entire supply must be distributed to the destination. Similarly, each destination has fixed demand of units, where the entire demand must be received from the sources.

The liner programming problem of a transportation model is given below;

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

subject to :

$$\sum_{j=1}^{n} x_{ij} \le s_i, \text{ for } i = 1,2,3.....m$$

$$\sum_{i=1}^{m} x_{ij} \ge d_j, \text{ for } j = 1,2,3.....n$$

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

I=1,2,.....m is the set of origins
J=1,2,.....n is the set of destinations
$X_{ij}$ =The quality transported from the i-th origin to the j-th destination
$C_{ij}$= Per unit cost in transporting goods from i-th origin to j-th destination
$S_i$=The amount available at the the i-th origin
$D_j$=The demand at the j-th destination

## 2. Numerical Example

Here counter example is given in which transportation problem is solved using AVAM and VAM. A mathematical model of a transportation problem is given below:

**Table 1**

| Source | D1 | D2 | D3 | D4 | SUPPLY |
|---|---|---|---|---|---|
| S1 | 3 | 4 | 3 | 5 | 5 |
| S2 | 7 | 6 | 4 | 6 | 6 |
| S3 | 3 | 5 | 7 | 8 | 2 |
| S4 | 5 | 4 | 9 | 5 | 6 |
| DEMAND | 4 | 6 | 2 | 7 | 19 |

**SOLUTION of transportation problem using Vogel's approximation method (VAM):-**

**Table 2**

| Source | D1 | D2 | D3 | D4 | Supply |
|---|---|---|---|---|---|
| S1 | 2 3 | 4 | 3 | 3 5 | 5 |
| S2 | 7 | 6 | 2 4 | 4 6 | 6 |
| S3 | 2 3 | 5 | 7 | 8 | 2 |
| S4 | 5 | 6 4 | 9 | 5 | 6 |
| Demand | 4 | 6 | 2 | 7 | 19 |

Total Transportation Cost =
2*3+3*5+2*4+4*6+2*3+6*4=83

| SOURCE | D1 | D2 | D3 | D4 | SUPPLY |
|---|---|---|---|---|---|
| S1 | 4 3 | 4 | 3 | 1 5 | 5 |
| S2 | 7 | 6 | 2 4 | 4 6 | 6 |
| S3 | 3 | 2 5 | 7 | 8 | 2 |
| S4 | 5 | 4 4 | 9 | 2 5 | 6 |
| DEMAND | 4 | 6 | 2 | 7 | 19 |

**Solution of example using Advanced Vogel's approximation method (AVAM):-**

| SOURCE | D1 | D2 | D3 | D4 | SUPPLY |
|---|---|---|---|---|---|
| S1 | 4 3 | 4 | 3 | 1 5 | 5 |
| S2 | 7 | 6 | 2 4 | 4 6 | 6 |
| S3 | 3 | 2 5 | 7 | 8 | 2 |
| S4 | 5 | 4 4 | 9 | 2 5 | 6 |
| DEMAND | 4 | 6 | 2 | 7 | 19 |

Total transportation cost =
4*3+1*5+2*4+4*6+2*5+4*4+2*5=85
Optimal solution: The optimal solution determined BY MODI is 83

## 3. Result Analysis

In above example, we observed that feasible solution using AVAM has not better solution than VAM . the comparison table of the solution is given below:

| Methods | Transportation problem |
|---|---|
| VAM | 83 |
| AVAM | 85 |
| Optimal solution | 83 |

## 4. Conclusion

In this paper, we have find out that Vogel approximation method (VAM) does not always create computational error. Even it gives better solution than advanced Vogel approximation method (AVAM) in some cases.

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