Advances and Applications in Mathematical Sciences
Volume 20, Issue 4, February 2021, Pages 555-560


# FINDING OPTIMAL SOLUTION OF THE TRANSPORTATION PROBLEM WITH MODERN ZERO SUFFIX METHOD

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## Abstract

In this paper a new procedure namely Modern Zero Suffix (MOZES) method is proposed to find the IFBS it meets optimal solution for the transportation problem. A new algorithm is generated to find the optimal solution for the transportation problem with the aid of above said notion. The relevant numerical illustrations are given to justify the above proposed notion.

## 1. Introduction

In operations research transportation problem is a modern class of linear programming problem. Transportation problems used in various fields such as scheduling, assignment, and product mix problems and so on. Dantzing G. B [2] solved linear programming and extensions. Nagoor Gani and Stephen Dinagar [3] proposed a note on linear programming in fuzzy environment. Abdul Quddoos et al. [1] finding a new method of an optimal solution for transportation problems. Stephen Dinagar and Keerthivasan [4, 5, 6] suggested some new algorithm for transportation problem.

2010 Mathematics Subject Classification: admitting: 90B06, 90C05, 90C46.
Keywords: transportation problem, IBFS, optimal solution, modern zero suffix method.
Received January 12, 2020; Accepted May 13, 2020

In this effort, a new method is recommended to examine optimality of the TP. Also, the new algorithm provided now to find the optimality. A relative study is too carried out by solving transportation problems.

The organization of this paper is arranged as follows. In section 2, the proposed Modern Zero Suffix method is lead with its algorithm illuminated step by step. The numerical illustrations are obtainable in section 3. A relative analysis is carried out in section 4. Finally the conclusion part is in section 5.

## 2. Algorithm of Modern Zero Suffix (MOZES) Method

**Step 1:** Build the cost tables from the certain problem. Inspect whether sum of the supply equal to sum of the demand, if it stable then go to step 2. If not introduce a dummy row or dummy column.

**Step 2:** In a cost matrix, deduct each row by the least element of this row. From the concentrated matrix deduct each column by the least element of its column. From the concentrated matrix, every row and every column has no less than one zero.

**Step 3:** Select one zero and computation the number of zeros in the corresponding row and column expect the selected zero, and mark the sum of the number of zeros in suffix.

**Step 4:** Select every zero and mark the suffix as the way of step 3.

**Step 5:** Select the lowest suffix and allocate the conforming cell. Each allocation is in rising order of suffices.

**Step 6:** Sometime suffix values are identical; select the minimum cost cell of the conforming suffix values.

**Step 7:** When the allocation if we ensure less than m+n-1 cells, reprise the process from step 2 to step 6.

**Step 8:** Remain the process all rim necessities are fulfilled.

## 3. Numerical Illustrations

**Illustration 3.1.** Solve the optimal cost of TP with three factories and three markets:

**Table-3.1.1**

| | $M_1$ | $M_2$ | $M_3$ | Supply |
|---|---|---|---|---|
| $F_1$ | 3 | 3 | 5 | 9 |
| $F_2$ | 6 | 5 | 4 | 8 |
| $F_3$ | 6 | 10 | 7 | 10 |
| Demand | 7 | 12 | 8 | |

Solution

**Table-3.1.2**

| | $M_1$ | $M_2$ | $M_3$ | Supply |
|---|---|---|---|---|
| $F_1$ | $0_2$ | $0_1$ | 2 | 9 |
| $F_2$ | 2 | 1 | $0_0$ | 8 |
| $F_3$ | $0_1$ | 4 | 1 | 10 |
| Demand | 7 | 12 | 8 | |

Here minimum suffix value is 0 and the conforming supply and demand are equal so we have a choice the next minimum suffix is 1.

**Table-3.1.3**

| | $M_1$ | $M_2$ | $M_3$ | Supply |
|---|---|---|---|---|
| $F_1$ | 3 | $3_9$ | 5 | 9 |
| $F_2$ | 6 | $5_3$ | $4_5$ | 8 |
| $F_3$ | $6_7$ | 10 | $7_3$ | 10 |
| Demand | 7 | 12 | 8 | |

Minimum Cost =125.

**Illustration 3.2.** Solve the optimal cost of TP with three factories and four markets:

**Table-3.2.1**

| | $M_1$ | $M_2$ | $M_3$ | $M_4$ | Supply |
|---|---|---|---|---|---|
| $F_1$ | 9 | 8 | 5 | 7 | 12 |
| $F_2$ | 4 | 6 | 8 | 7 | 14 |
| $F_3$ | 5 | 8 | 9 | 5 | 16 |
| Demand | 8 | 18 | 13 | 3 | |

**Solution:**

**Table-3.2.2**

| | $M_1$ | $M_2$ | $M_3$ | $M_4$ | Supply |
|---|---|---|---|---|---|
| $F_1$ | 4 | 1 | $0_0$ | 2 | 12 |
| $F_2$ | $0_2$ | $0_1$ | 4 | 3 | 14 |
| $F_3$ | $0_2$ | 1 | 4 | $0_1$ | 16 |
| Demand | 8 | 18 | 13 | 3 | |

**Table-3.2.3**

| | $M_1$ | $M_2$ | $M_3$ | $M_4$ | Supply |
|---|---|---|---|---|---|
| $F_1$ | 9 | 8 | $5_{12}$ | 7 | 12 |
| $F_2$ | 4 | $6_{14}$ | 8 | 7 | 14 |
| $F_3$ | $5_8$ | $8_4$ | $9_1$ | $5_3$ | 16 |
| Demand | 8 | 18 | 13 | 3 | |

Minimum cost = 240.

**Illustration 3.3.** Solve the optimal cost of TP with four factories and three markets:

**Table-3.3.1**

| | $M_1$ | $M_2$ | $M_3$ | Supply |
|---|---|---|---|---|
| $F_1$ | 3 | 2 | 8 | 250 |
| $F_2$ | 1 | 6 | 3 | 350 |
| $F_3$ | 7 | 5 | 3 | 400 |
| $F_4$ | 5 | 9 | 2 | 200 |
| Demand | 300 | 400 | 500 | |

**Solution:**

**Table-3.3.2**

| | $M_1$ | $M_2$ | $M_3$ | Supply |
|---|---|---|---|---|
| $F_1$ | 2 | $0_0$ | 6 | 250 |
| $F_2$ | $0_0$ | 4 | 1 | 350 |
| $F_3$ | 5 | 2 | $0_1$ | 400 |
| $F_4$ | 3 | 7 | $0_1$ | 200 |
| Demand | 300 | 400 | 500 | |

**Table-3.3.3**

| | $M_1$ | $M_2$ | $M_3$ | Supply |
|---|---|---|---|---|
| $F_1$ | 3 | $2_{250}$ | 8 | 250 |
| $F_2$ | $1_{300}$ | 6 | $3_{50}$ | 350 |
| $F_3$ | 7 | $5_{150}$ | $3_{250}$ | 400 |
| $F_4$ | 5 | 9 | $2_{200}$ | 200 |
| Demand | 300 | 400 | 500 | |

Minimum Cost = 2850.

## 4. Result Analysis

Above table, it is evidently noted that our suggested method "Modern Zero Suffix Method" is meet to MODI method.

| METHOD | Total Transportation Cost | | |
|---|---|---|---|
| | Illustration-1 | Illustration-2 | Illustration-3 |
| Least Cost Method | 159 | 248 | 2850 |
| VAM | 143 | 248 | 2850 |
| MODI- Method | 125 | 240 | 2850 |
| Modern Zero Suffix (MOZES)Method | 125 | 240 | 2850 |

## 5. Conclusion

A novel approach is proposed and termed it as modern zero suffix (MOZES) method to inspect the optimal solution for the TP. The leading improvement of the proposed algorithm is very calm to realize and performs stress-free calculation and provides the optimal solution with least steps. This new Proposed method is more real to find out the minimum cost when associate with additional existing methods for decision makers.

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