Ranking of Heptagon Number using Zero Suffix Method

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Abstract: A ranking method based on heptagon fuzzy numbers used to a transportation problem with fuzzy quantities in this process. Any transportation problem can be converted in to get on optimal solution by this ranking procedure we find the optimal solution for fuzzy transportation problem by using zero suffix method.

Keywords: Ranking, Heptagon Fuzzy numbers, Zero suffix method.

1. Introduction

A Fuzzy Transportation problem is a transportation problem in which the transportation costs, requirement and available are fuzzy quantities. The transportation problem is one of the earliest applications of LPP.

In section 2 preliminaries and section 3 for ranking procedure and formula then finally discuss numerical example for heptagon numbers.

In this work, we justify the realistic problems, for example the transportation with fuzzy costs. The method is to rank the crisp values of the objective function by some ranking method for numbers to compute equal example. The concept is to modify a problem with fuzzy variables in the form of linear programming problem and solve it by the zero suffix method.

2. Preliminaries

2.1Definition

Let A be a classical set μₐ(x) be a real value function defined from R → [0,1]. A fuzzy set A’ with the function μₐ(x) is defined by A’ = {(x, μₐ(x)): x ∈ A and μₐ(x) ∈ [0,1]} The function μₐ(x) is known as the membership function.

Definition

A fuzzy number is a convex normalized fuzzy set of the real line R whose membership function is piecewise continuous.

3. Ranking of Heptagon Fuzzy Number

Let Ā_hep = (a₁, a₂, a₃, a₄, a₅, a₆, a₇) and Ė_hep = (e₁, e₂, e₃, e₄, e₅, e₆, e₇) be two heptagon fuzzy numbers , then

<table>
<thead>
<tr>
<th>D</th>
<th>E</th>
<th>F</th>
<th>Supply</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>(3,6,2,1,5,0,4)</td>
<td>(2,3,1,4,3,6,5)</td>
<td>(2,4,3,1,6,5,2)</td>
</tr>
<tr>
<td>B</td>
<td>(2,7,7,6,3,2,1)</td>
<td>(1,3,5,7,9,11,13)</td>
<td>(0,1,2,4,6,0,5)</td>
</tr>
<tr>
<td>C</td>
<td>(3,6,3,2,1,8,7)</td>
<td>(3,4,3,2,1,1,0)</td>
<td>(2,4,6,8,10,12,14)</td>
</tr>
</tbody>
</table>

Demand | (0,4,6,4,6,2,0) | (2,7,6,3,2,1) | (0,1,2,4,6,0,5) |

Consider the following transportation problem

4. Graphical Representation

5. Numerical Example

In this paper for a heptagon fuzzy number is Ā_hep = (a₁, a₂, a₃, a₄, a₅, a₆, a₇) a ranking method is from the following formula. R(Ā_hep) = \frac{a₁ + a₂ + a₃ + a₄ + a₅ + a₆ - a₇}{5} → 1
Applying Ranking formula (1) and using Zero Suffix Method we get

\[
\begin{array}{|c|c|c|c|c|}
\hline
 & D & E & F & \text{Supply} \\
\hline
A & 4.4 & 2.6 & 1.2 & 2.8 & 3.8 & 5.6 \\
B & 5.2 & 0.2 & 4.6 & 1.6 & 1.6 & 1.8 \\
C & 3.2 & 3.8 & 2.8 & 5.6 & 3.8 \\
\hline
\text{Demand} & 4.4 & 5.2 & 1.6 \\
\hline
\end{array}
\]

Therefore the total cost is \(28.92\).

6. Conclusion

Thus we have obtained an optimal solution for a fuzzy transportation problem using heptagon fuzzy number. A new approach called zero suffix method is to find the optimal solution also discussed. This method is very easily approach comparing to other method to solve fuzzy problem.

References