

## SHORTEST PATH PROBLEM UNDER INTERVAL VALUED NEUTROSOPHIC SETTING

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Published online: 5 March 2018

### ABSTRACT

This paper presents a study of neutrosophic shortest path with interval valued neutrosophic number on a network. A proposed algorithm also gives the shortest path length using ranking function from source node to destination node. Here each arc length is assigned to interval valued neutrosophic number. Finally, a numerical example has been provided for illustrating the proposed approach

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### 1. INTRODUCTION

Neutrosophy was pioneered by Smarandache in 1998. It is a branch of philosophy which studies the origin, nature, and scope of neutralities, as well as their interactions with different



ideational spectra. Smarandache generalized the concepts of fuzzy sets [28] and intuitionistic fuzzy set [25] by adding an independent indeterminacy-membership. Neutrosophic set is a powerful tool to deal with incomplete, indeterminate and inconsistent information in real world, which have attracted the widespread concerns for researchers. The concept of neutrosophic set is characterized by three independent degrees namely truth-membership degree (T), indeterminacy-membership degree (I), and falsity-membership degree (F). Later on, Smarandache extended the neutrosophic set to neutrosophic overset, underset, and offset [46].

The concept of single valued neutrosophic theory has proven to be useful in many different field such as the decision making problem, medical diagnosis and so on. Later on, the concept of interval valued neutrosophic sets [15] (IVNS for short) appear as a generalization of fuzzy sets, intuitionistic fuzzy set, interval valued fuzzy sets [20], interval valued intuitionistic fuzzy sets [26] and single valued neutrosophic sets. Interval valued neutrosophic set is a model of a neutrosophic set, which can be used to handle uncertainty in fields of scientific, environment and engineering. This concept is characterized by the truth-membership, the indeterminacy-membership and the falsity-membership independently, which is a powerful tool to deal with incomplete, indeterminate and inconsistent information.

### 3. EXPERIMENTAL

The shortest path problem is a fundamental algorithmic problem, in which a minimum weight path is computed between two nodes of a weighted, directed graph. This problem has been studied for a long time and has attracted researchers from various areas of interests such operation research, computer science, communication network and so on. There are many shortest path problems [2, 3, 4, 12, 31, 45] that have been studied with different types of input data, including fuzzy set, intuitionistic fuzzy sets, trapezoidal intuitionistic fuzzy sets vague set. Till now, few research papers deal with shortest path in neutrosophic environment. Broumi et al.

### 4. CONCLUSION

In this paper we developed an algorithm for solving shortest path problem on a network with

interval valued neutrosophic arc lengths. The process of ranking the path is very useful to make decisions in choosing the best of all possible path alternatives. We have explained the method by an example with the help of a hypothetical data. Further, we plan to extend the following algorithm of interval neutrosophic shortest path problem in an interval valued bipolar neutrosophic environment.

## 5. ACKNOWLEDGEMENTS

The authors are very grateful to the chief editor and reviewers for their comments and suggestions, which is helpful in improving the paper.

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**How to cite this article:**

Broumi S, Bacali A, Talea M, Smarandache F, Kishore K, Şahin R. Shortest path problem under interval valued neutrosophic setting. J. Fundam. Appl. Sci., 2018, 10(4S), 131-137.