Chapter 4
Application of n-Cylindrical Fuzzy Neutrosophic Sets in Education Using Neutrosophic Similarity Index and Neutrosophic Score Ratio

Sarannya Kumari R.
Catholicate College, Pathanamthitta, India

Sunny Joseph Kalayathankal
Jyothi College of Engineering, Thrissur, Kerala, India

Mathews M. George
Providence College of Engineering and School of Business, India

Florentin Smarandache
https://orcid.org/0000-0002-5560-5926
University of New Mexico, USA

ABSTRACT

The n-Cylindrical fuzzy neutrosophic sets (n-CyFNS) with I as independent neutrosophic component, are one of the largest extension of fuzzy sets except fuzzy neutrosophic sets. Here the positive, neutral, and negative membership functions are satisfying the condition, $0 \leq \beta A(x) \leq 1$ and $0 \leq \alpha A_n(x) + \gamma A_n(x) \leq 1$, $n \geq 1$, is an integer. In this set, two constrains are defined, in order to broaden the membership value range. In this chapter, some applications of n-Cylindrical fuzzy neutrosophic sets in the field of education are presented, such as evaluating a funded project proposal and staff recruitment using a neutrosophic score ratio and a neutrosophic similarity index. A modest attempt is made to make sociometry more acceptable in the context of mathematics. For this, n-Cylindrical fuzzy neutrosophic relations (n-CyFNRs) are introduced. Using n-CyFNRs, this study hope to provide a new quantitative approach to sociometry.

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INTRODUCTION

In 1965, L. A Zadeh laid a new stepping stone to the crisp nature of the Mathematical field, by introducing Fuzzy sets for the first time (Zadeh,1965). After this remarkable contribution, the entire scientific field had been viewing the quantitative nature of uncertainties or vagueness. The most flexible way of handling situations is possible after this achievement. The next mile stone in this recordical history of fuzzy sets was the introduction of intuitionistic fuzzy sets by Atanassov in 1986(Atanassov,1986). There were a lot of drastic developments took place in this field and resulted in different types of fuzzy sets like Pythagorean fuzzy sets, Picture fuzzy sets, T-Spherical fuzzy sets etc. In 1998, F.Smarandache put forward the beginning of Neutrosophic era –which are characterized by the membership functions for truth (T), indeterminacy (I) and falsity (F)(Smarandache,1999). Nowadays, the Neutrosophic sets become an effective way to handle insufficient, unpredictable and incompatible data which exist in this world. F.Smarandache introduced the dependence degree of (also, the independence degree of) the fuzzy components, as well as the neutrosophic components, for the first time.(Smarandache,2016) Many distinct types of neutrosophic sets are also defined accordingly. Recently, Sarannya et.al, defined, n-cylindrical fuzzy neutrosophic sets, in which I is an independent variable. Here, the degree of positive, neutral and negative membership functions are satisfying the condition, $0 \leq \beta_A(x) \leq 1$ and $0 \leq \alpha_A{}^n(x) + \gamma_A{}^n(x) \leq 1$, $n>1$, is an integer(Sarannya et.al,2022).

Correlation coefficients are used to determine the strength of a relationship between two variables. The significance of correlation coefficients in the environment of fuzzy set stems from the matter that these can be applied to many fields of science and engineering. Human capital is a nation's greatest resource. The best teaching techniques must be made available to them in order to make this resource the best. Acquiring knowledge and information is the process of ensuring a bright future. Here we describe the application of n-Cylindrical fuzzy neutrosophic sets in the field of education using neutrosophic score ratio and neutrosophic similarity index which are the tools used to compare and correlate two n-CyFN numbers.

The rest of the chapter is designed as follows. Section 2 is about the basic concepts of the journey of fuzzy sets and Neutrosophic sets. In Section 3, we give the definitions and other related concepts of n-CyFNS. Section 4 comprises the introduction of n-Cylindrical fuzzy neutrosophic relations and related results. The section 5 is about three application of n-CyFNS in different context of education. First application is on how to evaluate the best project proposal for a funded project with the help of correlation coefficients in the n-CyFNS environment.

Teaching is a great and noble profession, and becoming a good and effective teacher requires extensive education and training. The field of education is constantly evolving, as are the expectations and demands placed on educators, who are responsible for shaping a child's future in ways that go far beyond simply imparting knowledge. During the COVID-19 pandemic, when all teaching institutions used online teaching methodologies, there may be a tendency to focus on technology. What qualities should be evaluated when hiring a teacher?

Second is about the recruitment of a teaching staff in this post pandemic era.

Jacob L. Moreno and Hellen Hall Jennings invented sociometry in 1946 as a method for measuring interpersonal attraction. The sociogram, a graphic representation of the interrelationships among members of a group, is used in sociometry. Through the third application, we make an attempt to interpret the Sociometry in n-CyFNs environment using n-CyFNRs. The last section, Section 6 is the conclusion part with some future directions.