Neutro-Intelligent Set is a particular case of the Refined Neutrosophic Set

Florentin Smarandache [1], Said Broumi[2,3]

[1] Mathematics, Physical and Natural Sciences Division University of New Mexico, 705 Gurley Ave. Gallup, NM 87301, USA ; smarand@unm.edu

[2] Regional Center for the Professions of Education and Training, Casablanca-Settat,Morocco; broumisaid78@gmail.com

[3] Laboratory of Information Processing, Faculty of Science Ben M'Sik University Hassan II, Casablanca, Morocco

Abstract

In this short note we show that the newly introduced concept of Neutro-Intelligent Set (NIS) deserves attention in its applications to the human brain activity, and that NIS is a particular case of the Refined Neutrosophic Set.

Keywords: Neutrosophic Logic, Physical Neutrosophy, gravitation, physics constants

1. Introduction

In order to simplify the notations, we use Latin descriptive letters, instead of Greek letters, to denote by T the truth (or membership), by I the indeterminacy, and by F the falsehood (or nonmembership).

2. Definition of Neutrosophic Set

Let U be a universe of discourse, and A be a non-empty neutrosophic subset of U, defined as follows:

$$A = \{x, \ < T_A(x), \ I_A(x), \ F_A(x) >, \ x \in U\},$$ where for all $x \in U$ one has

$$T_A(x), I_A(x), F_A(x) \in [0,1], 0 \le T_A(x) + I_A(x) + F_A(x) \le 3.$$

3. Definition of the Neutral Degree of the Neutrosophic Set

Sunny Raza Qureshi [1] has introduced the Neutral Degree (N_A) of the Neutrosophic Set, defined as follows:

$$N_A : U \to [0,1], N_A(x) = 1 - \frac{T_A(x) + I_A(x) + F_A(x)}{3}, x \in U.$$

4. Definition of the Neutro-Intelligent Set

It was a nice idea to extend the neutrosophic set from 3 to 4 components, where for all $x \in U$, the original components $T_A(x), \ I_A(x), \ F_A(x)$ remain totally independent from each other, while the fourth component $N_A(x)$ is totally dependent of the first three components.

Then Sunny Raza Qureshi [1] introduced the Neutro-Intelligent Set (NIS) by adding the neutral Degree to each element, defined as follows:

Let U be a universe of discourse, and A_{NIS} be a non-empty subset of U, defined as follows:

$$A_{NIS} = \{x, \; <T_A(x), \; I_A(x), \; N_A(x), F_A(x)>, \; x \in U\}, \text{ where for all } x \in U$$

$$T_A(x), I_A(x), N_A(x), F_A(x) \in [0,1], 0 \le T_A(x) + I_A(x) + F_A(x) \le 3,$$

$$N_A(x) = 1 - \frac{T_A(x) + I_A(x) + F_A(x)}{3}.$$

5. Example of Neutro-Intelligent Set

$$A_{RNS} = \{a_1(0.4, 0.2, 0.7, 0.3), a_2(0.7, 0.2, 0.6, 0.3)\}, \text{ because:}$$

$T_1 = 0.4$, $I_1 = 0.2$, $F_1 = 0.3$, whence the neutral $N_1 = 1 - \dfrac{T_1 + I_1 + F_1}{3} = 1 - \dfrac{0.4 + 0.2 + 0.3_1}{3} = 0.7.$

$T_2 = 0.7$, $I_2 = 0.2$, $F_2 = 0.3$, whence the neutral $N_2 = 1 - \dfrac{T_2 + I_2 + F_2}{3} = 1 - \dfrac{0.7 + 0.2 + 0.3_1}{3} = 0.6.$

6. Definition of the Refined Neutrosophic Set

In 2013 the neutrosophic theories were extended to the *refined [n-valued] neutrosophic set, refined neutrosophic logic, and refined neutrosophic probability respectively* [2], i.e. the truth value T was refined/split into types of sub-truths such as T_1, T_2, …, T_p, similarly indeterminacy I was refined/split into types of sub-indeterminacies I_1, I_2, …, I_r, and the falsehood F was refined/split into sub-falsehood F_1, F_2, …, F_s.

Let U be a universe of discourse, and A_{RNS} be a non-empty subset of U, then the Refined Neutrosophic Set is defined as follows:

$$A_{RNS} = \{x, \; <T_{1A}(x), \; T_{2A}(x), ..., T_{pA}(x); I_{1A}(x), \; I_{2A}(x), ..., I_{rA}(x); F_{1A}(x), \; F_{2A}(x), ..., F_{sA}(x)>, \; x \in U\},$$

where p, r, s are positive integers, and at least one of them is ≥ 2,

also for all $x \in U$,

$$T_{1A}(x), \; T_{2A}(x), ..., T_{pA}(x); I_{1A}(x), \; I_{2A}(x), ..., I_{rA}(x); F_{1A}(x), \; F_{2A}(x), ..., F_{sA}(x) \in [0,1].$$

If one takes the particular case: p = 1, r = 2, s = 1, one gets T, I_1, I_2, F, with I_1 = indeterminacy and I_2 = neutrality, one gets the Neutro-Intelligent Set (NIS). The original part of the NIS is that I_2 (neutrality) is taken as dependent from T, I, and F.

7. Applications

The author [1] has introduced a neutrosophic model of the human brain, the Multi-Phase/State Neutrosophic Set and aggregated it to its Neutro-Intelligent Set forming a Final Phase Neutrosophic Set, to analyze the human mind uncertainty, especially the sentimental and emotional activities.

Conflicts of Interest: "The authors declare no conflict of interest."

References

[1] Sunny Raza Qureshi, New Dimensions in MCDM with Multi Phase Hyper Neutrosophic Sets, Master of Science In Mathematics, Supervisor Dr. Madiha Qayyum Senior Scientific Officer (OG-II), COMSATS University Islamabad, Lahore Campus, Pakistan, Spring 2021.

[2] Florentin Smarandache, n-Valued Refined Neutrosophic Logic and Its Applications in Physics, Progress in Physics, 143-146, Vol. 4, 2013;
https://arxiv.org/ftp/arxiv/papers/1407/1407.1041.pdf
http://fs.unm.edu/n-ValuedNeutrosophicLogic-PiP.pdf