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Acceptance Sampling in the Era of Neutrosophic Statistics: A Comprehensive Review

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Abstract: In recent years, one can visualize the world is full of indeterminacy, a more precise imprecision is required. For this a novel branch of philosophy called 'neutrosophy', studies the origin, nature and scope of neutralities and their interactions with different ideational spectra. Neutrosophy is the base of neutrosophic logic, a multiple value logic that generalizes the fuzzy logic, of neutrosophic set that generalizes the fuzzy set, of neutrosophic probability and statistical that generalizes the classical and impression probability and statistics respectively. Neutrosophic set theory was first proposed in 1998 by Florentin Samrandache, oriented towards real world scientific and engineering applications. Neutrosophic Statistics (NS) is an extension of the Classical Statistics (CS), where in the former the data may be ambiguous, vague, imprecise, incomplete, even unknown uses sets or range of values instead of crisp numbers. In accordance with the development of neutrosophic sets, probability, the neutrosophic statistics could be better studied. Recent studies reflect some of the remarkable works in acceptance sampling plans, life testing experiments and medical field with their performance measures where more vagueness and imprecision situation arises. This paper intended to cover the principles, development, in scheming and applying Neutrosophic Statistics in the acceptance sampling plans and systems with various base line distributions applicable in the manufacturing industries as per the shop floor situations.

Keywords: Fuzzy Set, Fuzzy Logic, Neutrosophy, Probability, Classical Statistics, Neutrosophic Statistics.

1. Introduction

In recent years, everything in the globe is jam-packed with indeterminacy, imprecise even though it is well planned and determined, the Neutrosophic becomes appear and make its place into investigation as an advancement/new avenue in the various domains of applications. Generally Classical statistics is used based on the deterministic nature of information and based on its structure and its scale. In some circumstances, the quality characteristics may not be certain enough leading to vagueness or impreciseness situation. Accordingly, Fuzzy Set Theory (FST) takes its place to model the uncertainty in the manufacturing industries till the end of the last century. Due to exponential growth of data knowledge in the world of digit technology, an extension of Fuzzy, known as

Neutrosophic Logic (NL) is in progression to overcome these uncertainties that delays in the decision-making process. Thus, NL occupied its role in the development of engineering sectors especially in the Quality Control (QC) sectors through Acceptance Sampling Plans (ASPs) and Systems.

In any manufacturing industry, it is mandatory to check the conformity of the produced or finished items with the standard quality specifications. While performing the 100% inspection, the cost may be too high in inspecting or testing all the produced items for the quality standards becomes more time consuming. Accordingly, the acceptance sampling plans procedures is applied to decide the quality of the produced items in inspecting set of sample items. In this modernized and technocratic scenario some of the real case problems, the classical acceptance sampling plans are not applicable due to the indeterministic environment to assess the degree of association. FST is an efficient and popular approach to model the uncertainty and has also been successfully used in ASPs. In FST, the uncertainty modeling is built on the term Membership Function ($\mu(x)$) by using a continuous variable (x) inside [0,1] interval in a space of (X). To overcome the indeterministic environment more effectively, NL one of the fuzzy extensions have been developed known to be 'Intuitionistic Fizzy Sets (IFSs)allows slackness for non-determination about the membership and gives modelling in human related evaluations by the help of this ability. IVFs are with three terms for membership(truthiness), non-membership(falsity) and indeterminacy and provides better results in modelling the uncertainty depending on human factor.

During the inspection cycle, the operator may be unsure in classifying the semi-defective items as defective or non-defective because of some reasons such as technical restrictions. The traditional FST assign the items to one of the two possible sets: defective or non-defective. Several authors contributed in designing and constructed tables for the sampling plans and systems using Fuzzy Set. This behaviour creates diverseness between real life and calculated results. In such cases, FST do not suits in this situation, accordingly in order to make decision and do deal with indeterminacy in the observations and the proportion parameters, Neutrosophic Logic attracts the researchers as a new emerging tool for uncertain data processing called as neutrosophic set used for uncertainty analysis in data sets.

Based on Neutrosophic Set and Neutrosophic Logic, Smarandache (2014) proposed Neutrosophic Statistics (NS) which is the generalization of Classical Statistics (CS) that can be applied to analyse the data under uncertainty environment. The Neutrosophic Statistics is an extension of the fuzzy statistics which deals with uncertainty and indeterminacy interval having three functions for **membership (truthiness), non-membership (falsity) and indeterminacy.** The NS consists of determined and undetermined parts. The mentioned triple-term structure of NSs supports to model these kinds of uncertainties more adequately. In recent years, some studies have been carried out in the literature in the area of acceptance sampling using NSs with reference to SSP and DSPs. The chief formulations of Acceptance Sampling plans for Single Sampling were derived based on Neutrosophic Statistics. This article focuses to study the emergence and evolution of Neutrosophic Statistics in acceptance sampling plans and systems.

2. Literature Study

In the manufacturing industries, acceptance sampling plans, systems and scheme plays a vital role in the decision-making process either to accept or reject the lot during the inspection process. Based on the predefined risk the output is obtained with minimum cost of small sample size on the deterministic nature of the available resources. With the advancement in the technology, tools and nature of data there is chance of getting vagueness, impreciseness and more uncertainty situations. To overcome this situation, Aslam [2] initiated and developed Neutrosophic Logic to study in both attribute and variable Acceptance sampling plans applicable to manufacturing industries. Later he proposed a new attribute sampling plan by employing the Neutrosophic interval method with Neutrosophic Binomial distribution for computing the lot acceptance, rejection and indeterminate probabilities at various specified sample size and acceptance numbers.

Later, Gurkan Isik and Ihsan kaya [7] designed Single and Double acceptance sampling plans based on Neutrosophic sets. The characteristics functions of ASPs such as Probability of accepting a lot (Pa), Average Outgoing Quality (AOQ), Average Total Inspection (ATI) and Average Sample Number (ASN) have been analysed based on NSs.

Uma and Nandhitha [15] reviewed the significance of Neutrosophic set on Acceptance Sampling plans (attribute and variable) in their study. Uma and Nandhitha [16] have constructed and evaluated the Quick Switching System using Neutrosophic Poisson Distribution with OC curve and necessary tables are framed for various parameters. Uma and Nandhitha [16] investigated the Quick Switching system using FSs and NSs and compared its efficiency.

3. Neutrosophic Statistics

Neutrosophic Statistics is defined as a group of data, such that the data or a part of the data are vague in some degree, and the methods used to evaluate the data. By using Classical Statistics, all data are evaluated. This is called the distinction between Neutrosophic Statistics and the Classical Statistics. In bags of cases, when indeterminacy is zero, the concept of Neutrosophic Statistics accompanies the concept of Classical Statistics. The neutrosophic measure which is used for measuring indeterminate data is used in those cases. The method of Neutrosophic Statistics will allow us to determine and classify the Neutrosophic data in order to identify the underlying patterns. Also emphasize that Neutrosophic probability, that indeterminacy is different from randomness. While classical statistics is denoting to randomness only, Neutrosophic Statistics is referring to both randomness and particularly indeterminacy. Like Classical Statistics, the Neutrosophic Statistics is classified as follows:

1. **Discrete Neutrosophic data**
   The values are hidden points here. In case: $6 + i1$, where $i1 \in [0, 1]$, 7, $26 + i2$, where $i2 \in [3, 5]$
2. **Continuous Neutrosophic data**
   The values in this case form one or more intervals, for example: [0, 0.8] or [0.1, 1.0] (i.e. not sure which one).
3. **Quantitative (numerical) Neutrosophic data**; a number for example in the interval [3, 5] (we do not know exactly), 47, 56, 64 or 68 (we do not know exactly);
4. **Qualitative (categorical) Neutrosophic data**; for example: blue or red (we don't know exactly), white, black or green or yellow (not knowing exactly).
5. **Univariate Neutrosophic data**, i.e. Neutrosophic data that composed of observations on a neutrosophic single attribute;
6. **Multivariable Neutrosophic data**, i.e. Neutrosophic data that composed of samples upon two or more attributes.

3.1 Definition of Single-valued Neutrosophic Set (NS)

Let U be a universe of discourse, and a set ANS $\subseteq$ U. Then ANS = { x, $T_A(x)$, $I_A(x)$, $F_A(x)$ | x $\in$ U}, where $T_A(x)$, $I_A(x)$, $F_A(x)$: U $\rightarrow$ [0, 1] represents the degree of truth-membership, degree of indeterminacy-membership, and degree of false non-membership respectively, with $0 \le T_A(x) + I_A(x) + F_A(x) \le 3$. The neutrosophic components TA(x), IA(x), FA(x) are not dependent with respect to each other

3.2 Neutrosophic Set

Type-1 fuzzy sets, or classical fuzzy sets, consider only the membership and only have $\mu(x) \in [0, 1]$ in the membership function. Since non-membership is states as 1- $\mu(x)$, type-1 fuzzy sets are only usable in complete information case. Intuitionistic sets (ISs) have functions for both membership and non-membership. While $\mu(x)$ is the membership function with the condition

$0 \le \mu(x)$ where $\mu(x) \in [0,1]$ is a membership function and $\vartheta(x) \in [0, 1]$ is the non-membership function, with the condition $0 \le \mu(x) + \vartheta(x) \le 1$ is satisfied (Atanassov 2003)

If the sum of membership and non-membership values is less than 1, it means incomplete information (Wang et al.,2005). NSs are the generalized form of ISs. It handles membership (truthiness), non-memership (falsity) and indeterminacy cases independent from each other. This independency makes possible to use inconsistent data in modelling (Smarandache, 2005).

$$(t, i, f) = (\text{truthiness, indeterminacy, falsity})$$

$$0 \le t + i + f \le 3 \qquad t, i, f \in [0,1] \tag{1}$$

Truthiness, indeterminacy and falsity values can be real numbers or interval-valued numbers. If these are interval-valued numbers, the set is named as interval Neutrosophic set and it is represented with three intervals. Summation of the biggest upper limits of these three intervals must between 0 and 3 (Wang et al., 2005). Representation of interval NSs is shown in Eq. (1):

$$x = \{[T_x^L, T_x^U], [F_x^L, F_x^U], [I_x^L, I_x^U]\}; \qquad T_x, I_x, F_x \in [0,1]$$

$$0 \le sup\ T_x + sup\ F_x + sup\ I_x \le 3 \tag{2}$$

3.3 Neutrosophic Logic

Smarandache studied the neutrosophy philosophy accordingly defined the concept of Neutrosophic Set and Neutrosophic logic, where he combined the neutrosophy into proposition with the percentage of truth (t%), percentage of indeterminate (l%) and percentage of failure (f%). NL is designed by Florentin Smarandache in 1995 and is an addition or advancement of fuzzy logic, intuitionistic logic, paraconsistent logic, and the three-valued logics that utilize an imprecise value. In neutrosophic logic, entire logical variable (x) is defined by the ordered triple denoted by x= (t, i, f) , where (t) be the degree of truthful, (f) be the degree of not truthful and (i) be the level of undetermined. The Indeterminate (I) classified into Contradiction and Uncertainty and get an addition of Belnap's four-valued logic. Additionally, (I) into contradiction, not certain, and not known and getting the five valued logic. In a general refined neutrosophic logic, (T) can be split into subcomponents (T_1, T_2, ..., T_p) and (I) into (I_1, I_2, ..., I_r) and (F) into (F_1, F_2, …, F_s) where $[p + r + s = n \ge 1]$. Even more: T, I, and/or F (or any of their subcomponents T_j, I_k, and/or F_l) can be countable or uncountable infinite sets. As an example: a statement can be between [0.4, 0.6] true, {0.1} or between (0.15, 0.25) indeterminate, and either 0.4 or 0.6 false

4. Acceptance Sampling and Neutrosophic Statistics

Acceptance Sampling Plan (ASP) is a specific plan stating the sampling procedures and acceptance criteria adopted to adopt an acceptance or rejection of a lot by inspecting a portion of the items. ASPs can be classified under two categories of the Quality Control such as Process Control and Product Control where Process Control deals with Variable Acceptance Sampling Plans and Product Control with Attribute Acceptance Sampling Plans.

- Variable ASPs focus on quality characteristics modelled with a statistical distribution.
- Attribute ASPs are focusing on the defectiveness of the inspected/finished products.

This study emphasis only on Attribute Sampling Plan under Neutrosophic Logic theory with an emergence and evolution in the Sampling plans and systems with different base line distributions such as Binomial, Poisson, Weighted Poisson, Gamma distribution and as such.

4.1 Attribute Sampling Plan

In this section, a novel attribute sampling plan with the Neutrosophic statistical interval method is studied. Let X be the quality of interest and the terms x^L and x^U are the minimum and the maximum value of the data. Let us consider a = [x^L , x^U] , the required range for the sample data. The neutrosophic interval probability (NIP) based on x^L and x^U is p = ([x^L , x^U] , (p_{ND}, p_I, p_D)), p_{ND}, p_I, p_D be the non-defective probability belong to determine part, indeterminacy probability belong to an intermediate defective part and falsity-probability belong to failure range of interval p ≤ [x^L, x^U], (p_{ND}, p_I, p_D), respectively. The total probability for the three cases satisfies $p_{ND} + p_I + p_D \geq 1$.

The proposed sampling plan using Neutrosophic statistics is stated as follows

Step-1: Choose a random sample of size n from a lot of the product and determine x^L and x^U.

Step-2: Calculate mean $\bar{x} = \sum_{i=1}^{n} x_i/n$ and standard deviation SD=$\sqrt{\sum_{i=1}^{n} (x_i \ - x)2/n}$-1

Step -3: Fix a = [x^L, x^U] and determine the probability of non-defective items

$p_{ND} = n_{ND}/n$, the indeterminate probability $p_I=n_I/n$ and the probability of an defective item $p_D = n_D/n$, where n_{ND}, n_I and n_D is the number of values in the non-failure interval $[\bar{x}$ - S, $\bar{x}$ + S] indeterminate/uncertain interval $[\bar{x}$ - 3S, $\bar{x}$ + 3S] and incredible/failure interval [x^L, $\bar{x}$ - 3S]; [$\bar{x}$ + 3S, x^U]

Step-4: Accept the lot if a number of defectives are smaller than the allowed number of defectives c, otherwise, reject it.

The proposed sampling plan composed of two parameters with 'c' as the acceptance number and 'n' sample size. The Neutrosophic Binomial Distribution (NBD) is used to derive the Neutrosophic Operating Characteristics (NOC)/Probability of acceptance function of the proposed plan with the following assumptions and conditions:

$$L(p) = P_R + P_I + P_{A;} \qquad p_{ND} + p_I + p_D \geq 1$$

Where P_R, P_I and P_A represent the lot rejection, intermediate and acceptance probabilities, respectively,

$$P_R = \frac{n!}{c!} P(R)^c \sum_{k=0}^{c} \frac{P(I)^K P(F)^{n-c-k}}{k!(n-c-k)!}, \tag{3}$$

$$P_I = \sum_{z=c+1}^{n} \frac{n!}{z!} P(I)^z \left[\sum_{k=0}^{c-z} \frac{P(R)^K P(F)^{n-z-k}}{k!(n-z-k)!}\right] \text{ and} \tag{4}$$

$$P_A = \sum_{y=c+1}^{n} T_y = \sum_{y=c+1}^{n} \frac{n!}{y!} P(I)^y \left[\sum_{k=0}^{n-y} \frac{P(R)^K P(F)^{n-y-k}}{k!(n-y-k)!}\right] \tag{5}$$

where P(R) = p_{ND} , P(I) = p_I and P(A) = p_D ; $p_{ND} + p_I + p_D \geq 1$.

The lot acceptance probability is the set of the lot rejection probability, indeterminate probability and lot acceptance probability is given by

$$L(P) = \{P_R, P_I, P_A\}$$

This proposed plan is applied in practical by taking the data about color STN displays from the company. Each of the pixels is divided into R, G and B sub-pixels. In this study, membrane thickness of pixel is the quality characteristic. In total of 55 data collected, 37 items belong to undamaged group, 16 items belong to unpredictable group and 2 items belong to defective group. The procedure of the new attribute sampling plan is implemented and found the chance of lot acceptance is 0% and the indeterminacy of the lot is 100%. In this situation and consumer is benefited and can choose a better decision further.

Table 1. Emergence of Neutrosophic Logic Theory

Author's Name / Year	Title
Founded by **Prof. Dr. Florentin Smarandache**, from the University of New Mexico, United States, 1998.	Neutrosophic Logic and Theory
Dr. Florentin Smarandache (2005)	Neutrosophic set-a generalization of the Intuitionistic Fuzzy Set.
Wang, H; Smarandache, F; Zhang, Y; Sunderraman, R (2005)	Interval Neutrosophic Sets and Logic: Theory and Applications in Computing.
Wang, H; Smarandache, F; Zhang, Y; Sunderraman, R (2010)	Single valued Neutrosophic Sets.
Developed by **Dr. Florentin Smarandache** 2014.	Introduction to Neutrosophic Descriptive Statistics (NDS)
Introduced in 2018 by **Prof. Dr. Muhammad Aslam**, from the King Abdulaziz University, Saudi Arabia.	Neutrosophic Inferential Statistics (NIS), Neutrosophic Applied Statistics (NAS), and Neutrosophic Statistical Quality Control (NSQC)
Prof. Dr. Florentin Smarandache, March 2025	Introduction of Neutrosophy, Neutrosophic Set, Neutrosophic Probability, Neutrosophic Statistics and their Applications to Decision Making – Chapter in Book : Neutrosophic Paradigms: Advancement in Decision Making and Statistical Analysis

Table 2. Evolution of Neutrosophic Logic Theory in Acceptance Sampling Plans and Systems

Author's Name / Year	Area of Study under Neutrosophic Logic
Muhammed Aslam (2018)	A New Sampling Plan Using Neutrosophic Process Loss Consideration
Muhammed Aslam(2018)	Control Chart for Monitoring Variation Using Multiple Dependent State Sampling Under Neutrosophic Statistics
Muhammad Aslam(2018)	Design of Sampling Plan for Exponential Distribution Under Neutrosophic Statistical Interval Method.
Muhammad Aslam(2019)	A variable acceptance sampling plan under Neutrosophic

	Statistical Interval method
Muhammed Aslam(2019)	A new attribute sampling plan using Neutrosophic statistical interval method
Aslam, Muhammad , Raza, Muhammad Ali, Ahmad, Liaquat(2019)	Acceptance sampling plans for two-stage process for multiple manufacturing lines under Neutrosophic Statistics
Muhammad Aslam, Gadde Srinivasa Rao, Nasrullah Khan & Liaquat Ahma(2019)	Two-stage sampling plan using process loss index under Neutrosophic statistics
Muhammad Aslam(2019)	Product Acceptance Determination with Measurement Error Using the Neutrosophic Statistics
Gurkan Isik & Ihsan Kaya(2020)	Analyzing single acceptance sampling plans based on Neutrosophic Poisson distribution
Gurkan Isik & Ihsan Kaya(2020)	Effects of Neutrosophic Binomial distribution on Double Acceptance sampling plans
G. Srinivasa Rao and Muhammad Aslam(2021)	Inspection plan for COVID-19 patients for Weibull distribution using repetitive sampling under indeterminacy
Nasrullah Khan & Liaquat Ahmad & Muhammad Azam & Muhammad Aslam & Florentin Smarandache(2021)	Control Chart for Monitoring Variation Using Multiple Dependent State Sampling Under Neutrosophic Statistics
Işık; Gürkan; Kaya; İhsan (2021)	Design and Analysis of Acceptance Sampling Plans Based on Intuitionistic Fuzzy Linguistic Terms
Ji Hwan Cha1& Maxim Finkelsteinb(2021)	Acceptance Reliability Sampling Plan for Discrete Lifetime Models
Muhammad Aslam, Gadde Srinivasa Rao &Mohammed Albassam (2022)	Sampling Inspection Plan to Test Daily COVID-19 Cases Using Gamma Distribution under Indeterminacy Based on Multiple Dependent Scheme
Işık; Gürkan; Kaya; İhsan(2022)	Design of Single and Double Acceptance Sampling Plans Based on Interval Type 2, Fuzzy Sets
Işık; Gürkan; Kaya; İhsan(2022)	Design of Single and Double Acceptance Sampling Plans Based on Neutrosophic Sets
Uma G & Nandhitha S(2023)	Analyzing and Evaluation of Quick Switching System using Neutrosophic Poisson Distribution
Gu¨ rkan Is¸ık &I ˙hsan Kaya (2023)	Design of acceptance sampling plans based on interval

	valued neutrosophic sets
Uma G & Nandhitha S(2023)	An Investigative Study on Quick Switching System using Fuzzy and Neutrosophic Poisson Distribution
Jayalakshmi S & Gopinath M (2024)	A Neutrosophic Single Acceptance Sampling Plan with Quality Parameters
Fuad S. Al-Duais(2024)	Neutrosophic Log-Gamma Distribution and its Applications to Industrial Growth
Uma G & Nandhitha S(2024)	Construction and Selection of Statistical parameters Using Quick Switching System based on Neutrosophic Sets – Cardboard Can Production Industry
Vennila J Basker P Kripa Josten Prakash V.S (2025)	On Quick Switching System with Different Sampling Plans using Fuzzy Neutrosophic Weighted Poisson Distribution
Uma G & Nandhitha S(2025)	Determination of Quick Switching System-Ss (Two Single Sampling Plans) Using Poisson Distribution
Jayalakshmi, S. & Vijilamery, S. (2025)	Neutrosophic Statistical Interval Methods for Reliability [Failure-Censored Sampling]
Al-Husseini, Z., Rashedi, K.A., & Aslam, M. (2025)	Repetitive sampling control chart for gamma distribution in uncertain environments

5. Conclusion

Acceptance sampling is an efficient quality control technique in terms of time and cost built on accepting and rejecting lots by inspecting only a small set of items instead of all population. ASP is a certain set of rules for the inspection process to reach specified consumer's and producer's risks. ASPs procure clear statistical outputs by using the mass quality metrics such as defective ratio of the items. Unfortunately, the mass quality metrics may not be known as certainly in some cases. Fuzzy logic and it's extension Intuitionistic Fuzzy logic is used in some studies to reformulate the sampling plans with traditional fuzzy defective ratio information. The studies using extensions of the FST are very limited. NSs have a big advantage on modeling real case problems having uncertainty related with human factors. Concerning indeterminacy and covering inconsistent information case makes NSs similar to human thinking where neutrosophic predicate is a vague or not well-known attribute, characteristic of the product leads to a three valued set function.

This study gives insights about, neutrosophic statistics in acceptance sampling plan such as single and double ASPs having certain plan parameters and Neutrosophic defection statuses have been offered for baseline distribution like Poisson and Binomial distributions. They offered ASPs are useful for such situations in which the inspected items can have measures too close to the specification limit while the measurement is not sensitive enough due to some constraints. They represent the real life better by eliminating the negative effects of risk avoider operators on inspection cycle. Recent and coming years, neutrosophic logic is applied in numerous spheres as medicine, health care industries, political analysis, social economics and engineering industries. Lastly, Neutrosophic Theory has a better and more powerful representation in this satellite era of impreciseness because of the distinctive and hidden factor - indeterminate (neither true nor false) for uncertainty.

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References

1. Al-Husseini, Z., Rashedi, K. A., & Aslam, M. (2025). Repetitive sampling control chart for gamma distribution in uncertain environments. Neutrosophic Sets and Systems, 77, 113–128. https://doi.org/10.5281/zenodo.14119402
2. Aslam, M. (2019a). A new attribute sampling plan using neutrosophic statistical interval method. Complex & Intelligent Systems, 5, 365–370. https://doi.org/10.1007/s40747-018-0088-6
3. Aslam, M. (2019b). A variable acceptance sampling plan under neutrosophic statistical interval method. Symmetry, 11(1), 114. https://doi.org/10.3390/sym11010114
4. Basker, P., Broumi, S., & Vennila, J. (2024). Applications of sets and functions by using an open sets in fuzzy neutrosophic topological spaces. Neutrosophic Sets and Systems, 65, 161–173.
5. Debnath, S. (2021). Neutrosophication of statistical data in a study to assess the knowledge, attitude and symptoms on reproductive tract infection among women. Journal of Fuzzy Extension and Applications, 2(1), 33–40.
6. Işık, G., & Kaya, İ. (2020). Effects of neutrosophic binomial distribution on double acceptance sampling plans. Conference Proceeding Science and Technology, 3(1), 68–76.
7. Işık, G., & Kaya, İ. (2022). Design of single and double acceptance sampling plans based on neutrosophic sets. Journal of Intelligent & Fuzzy Systems, 42(4), 3349–3366. https://doi.org/10.3233/JIFS-211915
8. Işık, G., & Kaya, İ. (2023). Design of acceptance sampling plans based on interval valued neutrosophic sets. Soft Computing, 27(20), 14601–14619. https://doi.org/10.1007/s00500-023-09027-6
9. Jayalakshmi, S., & Vijilamery, S. (2025). Neutrosophic statistical interval methods for reliability failure censored sampling. Neutrosophic Sets and Systems, 79, 508–512.
10. Mondal, K., Pramanik, S., & Giri, B. C. (2016). Role of neutrosophic logic in data mining.
11. Montgomery, D. C. (2009). Introduction to statistical quality control. Wiley.
12. Smarandache, F. (1998). A unifying field in logics: Neutrosophic logic. Neutrosophy, neutrosophic set, neutrosophic probability and statistics (6th ed.). InfoLearnQuest.
13. Smarandache, F. (2014a). Introduction to neutrosophic statistics. Sitech & Education Publishing.
14. Smarandache, F. (2014b). Neutrosophic theory and its applications.
15. Uma, G., & Nandhitha, S. (2022). Impact of neutrosophic statistics on acceptance sampling plans—A review. The International Journal of Analytical and Experimental Modal Analysis, 14(7).
16. Uma, G., & Nandhitha. (2023). Analyzing and evaluation of quick switching system using neutrosophic Poisson distribution. [Journal name], 20(4).
17. Uma, G., & Ramya, K. (2015). Impact of fuzzy logic on acceptance sampling plans—A review. Automation, Autonomous Systems, 7(7), 181–185. https://doi.org/10.36039/AA082015003
18. Vennila, J., Basker, P., & Kripa Josten Prakash, V. S. (2025). On quick switching system with different sampling plans using fuzzy neutrosophic weighted Poisson distribution. Neutrosophic Sets and Systems, 79. https://doi.org/10.5281/zenodo.14507004
19. Wang, H., Smarandache, F., Zhang, Y., & Sunderraman, R. (2012). Single valued neutrosophic sets and systems.

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