



# Neutrosophic Hypothesis to validate a Reform Project to Article 87 of the General Organic Code of Processes of Ecuador

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**Abstract.** Based on the fact that, according to the legislation in force in Ecuador, the appearance at hearings is mandatory for all those who intervene in a case to such an extent that their non-attendance is sanctioned in one case and abandoned in another, without taking into account that this absence may have been due to a fortuitous event or force majeure. The present investigation is focused on validating a project to reform Article 87 of the General Organic Code of Processes focused on making it possible to justify the defendant's absence. For the validation, a Neutrosophic Hypothesis was used, which allowed to demonstrate that the lawyers of Los Ríos Province are at least partially in agreement with the proposed reform.

**Keywords:** Single-Value Neutrosophic Set, score function, Neutrosophic p-value, Neutrosophic hypothesis

## 1 Introduction

Ecuador's General Organic Code of Processes (GOCP) regulates procedural activity in all matters, except constitutional, electoral and criminal, with strict observance of due process. Among its guiding principles, it states that the principles set out in the Constitution of the Republic, international human rights instruments, international instruments ratified by the State, the Organic Code of the Judicial Function, and those developed in this code shall be applied in all procedural activities [1].

The main premise of GOCP is the adoption of a trial by hearings, which are the central element of the oral process, although this does not mean that an exclusively oral process should be considered, but rather a mixed one, in accordance with the doctrine.

Article 87 states that:

Effects of failure to appear at hearings, in the event that the parties fail to appear, the following criteria shall be applied:

1. When the person who filed the complaint or application fails to appear at the corresponding hearing, his failure to attend shall be understood as abandonment.
2. When the defendant or requested party does not appear at the corresponding hearing, the hearing shall be continued and the sanctions and effects shall be applied, it being understood that the procedural opportunity to assert his/her rights is lost. However, in case of delay, your participation will be admitted, taking the hearing in the state in which you are. If the judge has the right to hold a hearing, he or she will continue it and must resolve the matter in accordance with the purpose for which it was convened [2].

It should be noted, therefore, that in drafting these rules, no account was taken of the fact that the absence of the defendant may have been caused by some fortuitous event or force majeure.

It is called force majeure or fortuitous case the unforeseen to which it is not possible to resist, such as a shipwreck, an earthquake, acts of authority exercised by public officials, etc. Thus, a fortuitous event or force majeure must be unimputable, that is, it must come from a cause entirely beyond the control of the parties; unforeseeable, that is, it could not have been foreseen within the ordinary and current calculations; and irresistible, that is, it could not have been avoided, even in the event that the appropriate defenses to achieve such objective were opposed[3].

Force majeure or cause majeure, or in Latin *vis maior*, is a fact that cannot be avoided and neither can it be foreseen. It is of great importance, in law, when establishing liability for damages.

When speaking of a fortuitous case, it is indicated that it is an unforeseen event, something that cannot be avoided. On the other hand, when force majeure is mentioned, it is said that the obligations that were foreseen cannot be fulfilled.

The case of force majeure begins in Roman law. The Romans understood by fortuitous case to mean any event that the human mind could not foresee or that could not be resisted, such as floods, enemy incursions, or fires [4].

The force majeure clause is common in contracts, and serves to cover possibilities beyond the control of the parties such as natural disasters, wars, etc. In international law, force majeure refers to a force that is impossible to avoid or foresee, beyond the control of a State, and which makes it impossible to comply with an international obligation [3].

Its interpretation is very important, because there are many cases that are on the borderline between force majeure and acts of God (such as strikes that prevent the provision of services).

In legal matters, it is very common to use the words force majeure and the responsibility that they produce, the consequences that may lead to legal responsibilities within a process [5, 6].

The sign of abandonment has been evident since Roman times. The Judge, at that time called a Magistrate, decided that the process was concluded when the procedure was finished, which did not affect the actor to present again the same cause for the same action.

Currently, a legal case is declared abandoned as long as there has been no movement within the instance, or no management of it, by either party, accuser or defendant. The abandonment is produced by stopping following the process or also by giving up the process, this produces a definitive separation of the instance. Therefore, procedural abandonment is a way of extinguishing the action within a process by not giving it the procedural momentum when there is inactivity in the procedural acts after a certain period of time has elapsed.

Two elements can be distinguished in abandonment [6]:

Subjective element: the parties are taken into account, which may be natural or legal persons who bring the suit (the actors) against other natural or legal persons (defendants). When the actor does not pursue the case, it is declared abandoned, and the same applies to the defendant. If none of the parties promotes the process as stated by the law, it is logical that the judge will declare the abandonment of it and will not be able to continue with the lawsuit.

Objective element: currently, GOCP states that eighty days must pass for a lawsuit to be declared abandoned, and once the case is declared abandoned, a lawsuit cannot be filed with the same action.

When analyzing the legislation in force in Latin American countries in this regard, we found that in several of them the defendant is able to justify his non-attendance [7].

For example, in Uruguay, Article 310.2 of the General Organic Code of Processes states that if the petitioner does not appear at the hearing, he will be considered to have desisted from it and will be punished with costs, but if he justifies his inability to attend due to unforeseen circumstances or force majeure, he will be suspended for one time only [8].

The Bolivian legislation states in its Procedural Code that if the defendant cannot attend the hearing, he will justify and will only be accepted for one time the non-attendance of the hearing, but he will have to justify with a reason if it is due to a fortuitous case or force majeure. Section II of this chapter of the Procedural Code sets out the steps to be taken to justify the defendant's failure to attend the hearing, presenting documentary evidence that specifically specifies the cause [9].

From this point, it can be concluded that the possibility of justifying non-attendance in order to avoid a penalty may be a guarantee for the person who will be affected by the penalty, which is consistent with the right to due process that must be observed in judicial and administrative proceedings. It is obvious that in procedural matters whoever asserts a claim or an exception or a relevant circumstance in the process from which legal consequences are derived is obliged to provide the corresponding evidence. By virtue of this, such obligation is contracted to summarily prove facts that are true, constituting a fortuitous case or a force majeure that merit the excuse.

However, in Ecuador, according to the current legislation, the appearance to the hearings is mandatory for all those who intervene in a case to such an extent that their non-attendance will be subject to sanctions in one case and in another be declared a case of abandonment.

For this reason, the objective of this research is to validate a draft reform to Article 87 of the General Organic Code of Processes of Ecuador, which would allow the defendant to justify his non-attendance at the hearing, whether due to an act of God or force majeure, in order to guarantee the constitutional principle of legal security set forth in Article 82 of the Constitution of the Republic [10].

This reform draft consists of incorporating a paragraph into Article 87(2) of GOCP, which states the following [2, 11]:

The non-attendance of the defendant at the hearing, duly justified for some reason of fortuitous case or force majeure, shall be justified within a period of 72 hours after the hearing.

## 2. Neutrosophic Hypothesis

Paradoxism [12] is a movement based on contradictions in science and literature, supported on excessive use of antitheses, oxymoron, contradictions, and paradoxes. From 1980-2020 hundreds of authors from tens of countries around the globe contributed papers to international paradoxist anthologies [13, 14]. It was founded by Romanian polymath Florentin Smarandache, who then extended it in 1995 to a new branch of philosophy called Neutrosophy, based on opposites and their neutral [15-17]. Neutrosophy movement originated many scientific branches, such as: neutrosophic logic, neutrosophic set, neutrosophic probability, neutrosophic statistics, and so on, with multiple applications in engineering, computer science, medical research etc. [18-22].

In this study, we make use of a neutrosophic hypothesis, where the distinction between the classical (statistical) hypothesis and the neutrosophic one is that in neutrosophic statistics the variables that describe the characteristics of the population are neutrosophic ones (they have indeterminate values or some unknown values, or an inexact amount of terms if the variable is discrete), or for the values we compare at least one of the characteristics of the population is neutrosophic (it is indeterminate, unknown or vague) [23].

A null hypothesis, denoted by  $NH_0$ , is the affirmation that is initially assumed as true, while the alternative neutrosophic hypothesis, denoted by  $NH_a$ , is the other hypothesis. When testing  $NH_0$  against  $NH_a$ , there are two possible conclusions: reject  $NH_0$  (if the evidence of the sample clearly suggests that  $NH_0$  is false), or accept  $NH_0$  hypothesis (if the sample does not support the evidence against  $NH_0$ ) [24].

## 3 Materials and methods

In order to accomplish the proposed objective, a survey was applied to legal professionals in the Babahoyo Canton, Los Ríos Province. We considered a population of 2818 lawyers of the above mentioned province, registered in the computer system of the Lawyers' Forum, of the Judiciary Council of Ecuador.

The sample size was calculated using the formula for finite population sample calculation:

$$n = \frac{Z^2 \cdot p \cdot q \cdot N}{Ne^2 + Z^2 \cdot p \cdot q} \quad (1)$$

The technique of simple random sampling combined with intentional sampling was applied, given the limitations of access to these professionals.

The survey was designed to measure the agreement of the lawyers surveyed with the main elements that support the judicial argument presented in this research, and to validate the proposed reform to Article 87, paragraph 2 of the General Organic Code of Processes.

The instrument applied was designed with the format of statements according to the Likert type surveys, as shown below:

1. The Carta Magna explicitly recognizes access to justice as a right.
2. A declaration of abandonment plays a defining role in non-criminal hearings because it makes it impossible to bring another lawsuit for the same cause.
3. The defendant's right to legal security is being violated by not allowing him to justify his non-attendance at a non-criminal hearing.
4. Article 87(2) of the General Organic Code of Processes should be amended to provide for the possibility of justifying the defendant's non-attendance at the hearing, when this is due to an act of God or force majeure.

The respondent was asked to state their position for each statement between "Totally Agree" and "Totally Disagree". To statistically process the survey results, the linguistic terms associated with a set of single-value neutral numbers were used as shown in table 1.

Linguistic term	SVN
Strongly agree (SA)	(1, 0, 0)
Agree (A)	(0.8, 0.15, 0.20)
Partially agree (PA)	(0.60, 0.35, 0.40)
Neither agree or disagree (NAD)	(0.50, 0.50, 0.50)
Partially Disagree (PD)	(0.40, 0.65, 0.60)
Disagree (D)	(0.20, 0.85, 0.80)
Strongly disagree (SD)	(0, 1, 1)

Table 1. Linguistic terms and its SVN associated

Single-value neutrosophic sets (SVNS) [25-27] for the management of undefined and inconsistent information is a relatively new approach based on Neutrosophy.

Neutrosophy is a mathematical theory developed by Florentin Smarandache to deal with indetermination. It has been the basis for the development of new methods to handle indeterminate and inconsistent information such

as neutrosophic sets and neutrosophic logic and, especially, in decision-making problems.

The truth value in the neutrosophic set is defines as follows [27]:

Let  $N$  be a set defined as:  $N = \{(T, I, F): T, F, I \subseteq [0,1]\}$ , a neutrosophic valuation  $n$  is a mapping of the set of propositional formulas, that is, for each  $p$  statement we have  $v(p) = (T, I, F)$ .

The single-value neutrosophic set (SVNS) [5] is a special case of a neutrosophic set, it was developed with the aim of facilitating real-world applications of neutrosophic sets and theoretical set operators.

A single-valued neutrosophic set (SVNS)[27]  $A$  in  $X$  is characterized by truth  $T_A(x)$ , indeterminacy  $I_A(x)$ , and falsehood  $F_A(x)$ , membership functions. For each point  $x$  in  $X$ , there are  $T_A(x), I_A(x), F_A(x) \in [0,1]$  and  $0 \leq T_A(x), I_A(x), F_A(x) \leq 3$ .

$A$  is denoted by  $\{A = [x, T_A(x), I_A(x), F_A(x)] \mid x \in X\}$ .

A single-value neutrosophic number (SVN number) allows the use of linguistic variables [28].

To convert the SVNs into crisp numbers, a scoring function was applied [29]. For each statement in the survey:

$$p(x) = 2 + T(x) + I(x) + F(x) \tag{2}$$

In the case of this research, the scoring function can be expressed as

$$p(x)_s = 2 + T(x)_s + I(x)_s + F(x)_s \tag{3}$$

Where:

$x$  is the number of the respondents,

$s$  is the number of the statements

and  $p(x)_s$  is the score function value of the respondent  $x$  for the stamen  $s$ .

The average value of the score function was then calculated using the formula:

$$\bar{p}(s) = \frac{\sum_{x=1}^{47} p(x)_s}{47} \tag{4}$$

Where:

$\bar{p}(s)$  is the score function average of the statement  $s$

Degrees of agreement were assigned for each of the 7 intervals into which the range (between 0 and 3) of the average score function was divided, see Table 2.

Agreement degree	Interval
Strongly agree	$2.57 < \bar{p}(s) \leq 3$
Agree	$2.14 < \bar{p}(s) \leq 2,57$
Partially agree	$1.71 < \bar{p}(s) \leq 2.14$
Neither agree or disagree	$1.29 < \bar{p}(s) \leq 1.71$
Partially Disagree	$0.86 < \bar{p}(s) \leq 1.29$
Disagree	$0.43 < \bar{p}(s) \leq 0.86$
Strongly disagree	$0 < \bar{p}(s) \leq 0.43$

**Table 2.** Intervals of the average score by agreement degree

This allowed the application of a neutral hypothesis test for the mean of the scoring function of the last survey statement, which specifically refers to the proposed modification.

A neutrosophic hypothesis is a statement about the neutrosophic values of a single or several population characteristics. The distinction between the classical (statistics) hypothesis and neutrosophic hypothesis is that in the neutrosophic statistics the variables that describe the population characteristics are neutrosophic (i.e. they have some indeterminate values, or several unknown values, or an inexact number of terms if the variable is discrete), or for the values that we compare at least one of the population characteristics is neutrosophic (i.e. indeterminate or unclear or vague value)[30].

As in classical statistics, we use the classical standard normal distribution of a random variable  $z$ , which is a normal distribution with the mean value  $\mu = 0$ , and standard deviation  $\sigma = 1$ .

If the neutrosophic null hypothesis about variable  $x$  is:

$$NH_0: \mu \in [a, b]$$

Where  $[a, b]$  is the hypothesized interval with  $a \leq b$ , then the neutrosophic test statistic is:

$$z = \frac{\bar{x} - [a, b]}{s/\sqrt{n}} \tag{5}$$

A Neutrosophic P-Value is defined in the same way as in classical statistics: the smallest level of significance at which a null hypothesis can be rejected, only that the neutrosophic P-value is not a crisp number as in classical statistics, but a set (in many applications it is an interval)

With the application of this contrast, we intended to verify that the lawyers of Los Ríos province, are at least partially in agreement with the proposal presented in this work given the judicial argument exposed, for a level of

significance between 0.90% and 0.95%, which shows the neutral character of the hypothesis test carried out.

### 3 Results

By applying the survey we obtained the sample results summarized in figure 1.

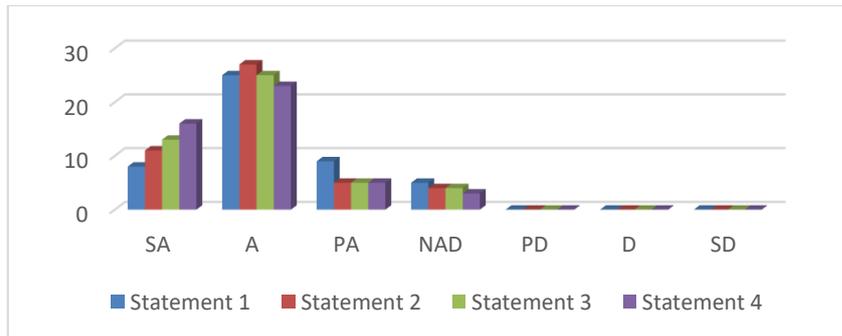


Figure 1. Sample results

In the bar graph it can be seen at first sight that for none of the elements that support the argument, degrees of agreement lower than “Neither agree or disagree” were obtained. For each of the proposed statements, “Agree” categories were obtained from more than 20 of the respondents. Finally, it should be noted that for the statement referring to the proposal for modification presented (4), the greatest number of opinions with a “Strongly agree” degree of agreement was obtained.

This sample analysis was complemented by the calculation of the central tendency statistic applied (4), through which it was possible to assign a global category for each question of the survey as proposed in table 2.

The average values of the scoring function were higher than 2.32 in all cases, so we can assure that 100% of the consulted lawyers agree with the proposals of this research. It is worth noting that the maximum average value for a question (2.513) was reached for question number 4, which is a good indicator of the level of acceptance of the proposal at the sample level. The results mentioned above are shown in table 3

	Statement 1	Statement 2	Statement 3	Statement 4
$\bar{p}(s)$	2,328	2,434	2,457	2,513
Agreement Degree	A	A	A	A

Table 3. Agreement degree for each statement

In order to demonstrate the assertion made: that the lawyers of Los Ríos province are, at least, partially in agreement with the Project of Reform to Article 87 of the General Organic Code of Processes of Ecuador regarding the fact that the defendant can justify his non-attendance at the hearing, whether by chance or force majeure, the following neutral hypothesis was put forward.

$$NH_0: \bar{P} \in [0, 1.71]$$

$$NH_1: \bar{P} > 1.71$$

As in this case, the interval was used as a level of significance. The contrast statistic used is:

$$z = \frac{2.513 - [0, 1.71]}{0.84 / \sqrt{47}}$$

$$z = [6.55, 20.51]$$

Therefore:

$$\text{Neutrosophic } p - \text{value} = [0, 0]$$

Then, we reject  $NH_0$  because  $\max\{[0,0]\} < \min\{[0.05, 0.1]\}$ .

In fact, these values of neutrosophic p-value, allow us to assure, for a level of significance even of 100%, that the population mean of the scoring function for the studied universe is higher than 1.71, and therefore, the hypothesis raised about a positive acceptance level of the proposal is confirmed.

### Conclusions

The consulted lawyers in this study showed a high degree of acceptance of both the basis of the legal argument presented, and the proposed amendment. The use of a Neutrosophic Hypothesis, allowed to demonstrate that the average population value of the acceptance of the presented reform is higher than 1.71, that is, it can be affirmed

that the lawyers of Los Ríos province are at least partially in agreement with making an amendment to Article 87 of the General Organic Code of Processes, on the possibility of the justification of the non-attendance of the defendant to the hearing, when this is due to fortuitous case or force majeure.

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