The evolution of law-making*

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Mathematical truths.

I voluntarily combined these terms that are normally considered in contrast one another in order to realize the syntagma *mathematical truths* that expresses a reality which exists and is continuously evolving but, in substance, does not have a name simply because we do not admit it exists. In fact, it is commonly held that the debatable nature of law is incompatible with the non-debatable nature of mathematics, and that mathematical logic cannot be identified with the logic of law. To the extent that, even if the relationship between law and numbers, between law and mathematics has long been investigated, nobody had ever thought to a mathematical law. The meaning of the syntagma *mathematical law* that we suggest is the one of a law that can be produced or applied making use of mathematical methods and words rather than numbers and other mathematical concepts. The concept of mathematical law that we suggest only refers to one part of law: the *law with truth*. The latter one is composed by ethical truths and scientific truths, meaning that part of law which implies a relationship between the rule of law and its parameter of verification that can only be either true or false. At the same time it explains the continuous and natural combination operated by the lawyer, the legislator or anyone who has to deal with law of ethical nature, where *ethical* does not refer to the moral meaning but rather the ethical-objective-etymological meaning, with the

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scientific truths.
Mathematical law already exists, it always existed and can in the future help to develop an analysis in order to build a future digital law, a digital law which is created by a man equipped with a software-legislator that elaborates and writes digital laws, then interpreted and applied, maybe making use of an option, by a man who uses an implementing software whose functions are complementary to the ones of the software-legislator.
In fact, when we consider that many publishers of reviews and journals already use softwares that digitally generate talks that narrate or explain facts, what prevents from thinking that this can expand itself soon also to the legal speeches?
I do not think that our way of thinking can stop when it has to face the fact that the technological development will never be enough. Abstractly it is never possible to limit a technological evolution that surprises us every day; in the same way, it is not possible to consider as an obstacle the myth of the exclusivity of a law which is composed by words or, also, the absolute primacy of words over numbers because these are old and evanescent myths, that have never been demonstrated but that would also additionally be irrelevant for the theme. The digital evolution concerns methods and concepts, not numbers. The type of law that I suggest would rather be a law which is thought and generated through mathematical words and truths.
Neither the statement that, on the contrary, the lawyer will never be only rational, as rationality and spirit coexist in him, is true. The combination of the mathematical method is able, better than other tools, to combine the human-spiritual-ethic character with the rational and scientific one.
What is, rather, the real obstacle to the realization of a digital logistics? According to me it is in the fact that it lacks a broad sharing of a general theory of law which is made of truths, methods and few and simple mathematical concepts. Till now the mathematical side of the general theory of law has been surprisingly undervalued and, as a consequence, the principles underlying certain sectors have been undervalued as well. If, for

example, the rules of law were typed through the categories which belong to the mathematical truths, which one of these truths would be suitable to represent the concept of justice? The one of certainty? The one of unavailability? The one of discretion?
Hence the objective of the relationship is to delineate some of the traits concerning the existence of a general mathematical micro model that tries to answer questions like these but making reference to current legislation. Finally, applying the logic which underlies few and simple mathematical concepts, I would propose a interpretative technique which is able to demonstrate, explain and apply some general and theoretical concepts of the existing mathematical law to project a future digital law.
It is now time to consider which ones are the relevant substantial relevant analogies between mathematics and law.
As mathematic has its truths, in the same way, law has its truths. In fact, like mathematics, also the major part of existing law is full of truth, not without truth.
This happens because Hobbes' general premise, that authority rather than truth makes law, is not true anymore. In fact, contrarily to what Hobbes argued, nowadays the laws must be true because they must be confronted with parameters which are external to the laws themselves (constitutional, European and international parameters) to the point that they are true, meaning that they are valid, if their variables are included within the solutions delimited by the given parameter and, instead, they are false, meaning that they are invalid, if their variables do not move from the group that is delimited by the parameter.
With reference to the formal considerations, it is possible to realize that the lawyer, interpreting or applying a rule of law with truth or proving the truth of a certain fact, is actually carrying out, in both cases, a reasoning which aims at finding the solution that can make the phrase of a text true. This way of reasoning is, from the point of view of the method, is analogous to the one of the mathematician who tries find the *x*, meaning the man who is solving a mathematical equation.

It follows that, once verified the compatibility or incompleteness of law, it is possible to apply analogically mathematical concepts.
A theory of law must rely on some mathematical truths. These are: identity, punctuality, interval and impossibility. In this way, thanks to mathematics, we can build the concepts of *identity truth, the punctual truth,* the *interval truth* and the *impossible truth*, which is possible in a certain environment but impossible in another one. In the first case the problem of finding a solution does not exist, in the second case there is only one solution, in the case of impossible truth there is none but truth is possible in a different environment.
When the truth is impossible the hypothesis of substitutive truth is realized, and by substitutive reality we mean the equivalent one if there is proportional equality or the alternative one if there is not proportional equality.
Legal truths are truths of philosophical-theoretical type. The *truth identity* is strictly linked to the one-sidedness to which all the others can access and corresponds to the identity of legal truth, as the environment of one-sidedness concerns everybody; the *truth correspondence* is used in order to create intervals in the environment of one-sidedness that concerns everybody.
When we are in the environment of the substitutive truth, what changes is the environment, which is the one of bilateralism or impartiality. Hence, in bilateralism the truth becomes *truth consent*, in the impartiality in front of the judge the truth becomes equity.
Legal types of truths. To the legal truth "identity" the normative, epistemological type of truth studied by the general theory of law, is the scientific one, the type of legal uncertainty linked to the latter is subjective, the way to overcome uncertainty can be found in the concept of liquidity. The kind of effectiveness linked to this type of truth is declarative. If, on the contrary, the type of truth we are dealing with is the one of *truth correspondence*, the normative or epistemological type becomes scientific and the type of legal uncertainty is subjective, the chance to overcome it is

linked to the possibility to ascertain the fact and the type of legal efficacy is declarative.

If the type of legal truth is, instead, the one of truth coherence, the normative or epistemological type becomes ethical, the type of legal uncertainty is objective , the way to overcome it is always the possibility to ascertain the fact, the kind of legal efficacy linked to this logic is the constitutive one.

If, instead, we are in the condition of impossibility, in the case of consent or in the case of equity, the normative type is ethical, the type of legal uncertainty is objective, the possibility to overcome does not exist and, hence, in the different position we have either the possibility to conciliate or the possibility to deliberate. In the latter situation the efficacy is constitutive.

How is it possible to distinguish the legal rules with truth? The types of legal rules are, according to the mathematical scheme, absolutely non-rebuttable and the example is the result of the sum of two numbers, as a factual example, or the 51% (majority) as an example of a legal concept: the consequence is an absolute unavailability.

If, instead, the mathematical type is punctual, then, the legal rule is in practice non rebuttable and the example of a factual concept is the measure of the surface of land, while the example of the legal concept is the degree of family relationship: here the deriving unavailability is a practice unavailability.

If, instead, the legal rule is not rebuttable within limits that are certain, for example the evaluation of the final inventories of an enterprise on the basis of more than one legal criteria, or the legal criterion to calculate a sanction from a minimum to a maximum which are determined by law, then the legal regime is discretion.

Then, there are legal rules which are indefinitely rebuttable, for example the determination of the market value of a good, the legal concept of serious inconsistency, where the legal concept which is realized is the one of unavailability to the contrary.

In summary, every legal operation incorporates, from its birth, a genetic mathematical code, that can be attributed to one out of these four types: identity, punctuality, interval and unavailability. This mathematical code, which is similar to the DNA of a cell, identifies the mathematical concept which characterises the rule, imposes the mathematical concept that characterizes the rule, imposes the mathematical method of use of the rule, from both the qualitative and temporal perspective. From the qualitative perspective, within the internal code to the rule, it is possible to obtain the rule to use itself that the rule incorporates so that the legal man uses the rule correctly, meaning that he does not abuse of the rule itself. The abuse would be a violation of the rule of use, meaning a violation of the mathematical code that we can find within the rule. The violation would be temporary because it obliges the man of law to individuate the type of law within the rule and, only later, to adopt, after a mathematical combination, the kind of reasoning or forma mentis correspondent to that code. Which ones would be, then, the basis for a future digital logistic? The conclusion that I join is that, in substance, starting from this mathematical code, it is possible to build a logistic based on the idea that the truth is within the law and the truth of the individual or the authority does not make the truth in the concrete case.