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Original Paper

The Fuzzy Completeness Theory

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Abstract

The Two Incompleteness Theorems of Kurt Friedrich Gödel and the Impossibility Theorem of Kenneth Arrow claim that logic, the most reliable of human knowledge, is incomplete or can be inconsistent. The Fuzzy Completeness Theory states that the Fuzzy Logic of Lotfi A. Zadeh has resolved the incompleteness and impossibility in logic and made logic complete and knowledge reliable with the new concept of Range of Tolerance, within which logic is still complete and knowledge, valid. In the Age of Reason about 300 years ago just prior to the Age of Science, reasoning is free for all, without the constraint of the laws of nature, which would be discovered in the Age of Science. However, the Scientific Method of reasoning by empirical verification depends so much on faith that it is logically and empirically dismissed by mathematicians and logicians, especially, after the exposure by Thomas Kuhn and Paul Feyerabend that a scientific advancement is akin to a religious conversion. On the other hand, mathematicians and logicians have been working steadily to find the limit of reliable knowledge. In the current state of knowledge, Kurt Gödel has the last word with his Two Incompleteness Theorems, which conclude that the most reliable of human knowledge, logic, is incomplete, casting doubt whether knowledge is completely reliable. Gödel's view is further supported by the Impossibility Theorem of Kenneth Arrow. However, Zadeh and the author of this paper extend Zadeh's concept of Range of Value in Fuzzy Logic to that of Range of Tolerance. Accordingly, Fuzzy Logic deals with the sacrifice of precision in the process of expanding the Range of Tolerance of a creation in order for the creation to survive and flourish for all the possibility of an uncertain future.

In knowledge, incompleteness in logic can be resolved by the Range of Tolerance covering the incomplete part or ignoring the infrequent impossibilities, and, thus, making logic valid, again. Knowledge is derived generally from reason. Technically, the Fuzzy Completeness Theory classifies 16 Methods of Reason. The 16 Methods are the combination of the 4 basic Methods of Reason: 1) Logic, 2) Mathematics, 3) Empirical Verification, and 4) Others, each of which has 2 forms: 1) Fuzzy and 2) Exact and two types: 1) Complete and 2) Incomplete. Gödel, Arrow, and the Author agree that no matter how rigorous is the Method of Reason the reason cannot be complete, when the reason is Exact.

When a solution is newly defined as an answer within the Range of Tolerance of the solution, Fuzzy Logic resolves the incompleteness in logic and becomes the new foundation of knowledge, replacing Exact Logic. With this definition of a solution, Fuzzy Logic covers the incomplete or the impossible parts of the solution by expanding sufficiently the Range of Tolerance to make reason complete and knowledge reliable, but only within the Range of Tolerance.

To summarize, even though the world's leading intellectuals have proven, directly, that logic is incomplete and, indirectly, that knowledge is invalid, reality is still operating smoothly, and science has even demonstrated the power of knowledge. The conflict between the most reliable knowledge, namely, logic and the real world is resolved by Fuzzy Logic, which introduces the new concept of Range of Tolerance, within which reality can still operate in accordance with the laws discovered by knowledge. In sum, reality is fuzzy, not exact.

The breakthrough impact of this paper centers around completeness theory and Fuzzy Logic. In the early 21st century, the mainstream knowledge is still not aware that the supply and demand model is incomplete, and that the DNA-protein system resembles computer science based on logic more than science based on experimentation. The current computer is based on exact logic and is designed for temporary existence, while the living system is design for permanent existence and must depend on the Range of Tolerance based on Fuzzy Logic to survive permanently in an uncertain future. Financial crises will be caused by the unstable investment return, which is the incomplete part in the supply demand model. Complexity crises will be caused by the lack of the requirement of permanence or complete automation, which is the ultimate solution to unlimited complexity. The 16 Methods of Reason correspond roughly to Culture Level Quotient (CLQ), which is a non-technical measure of a person, a people or a nation.

1. The Limit of Reason

The Completeness Theory is to complete the Two Incompleteness Theorems of Kurt Gödel (Smullyan, 1992) and to make possible the Impossibility Theorem of Kenneth Arrow (Arrow's impossibility theorem entry in the Stanford Encyclopedia of Philosophy), using Fuzzy Logic of Lotfi A. Zadeh (Lotfi, 1965). The Fuzzy Completeness Theory is supported by the demonstration of a Complete Mathematically Rigorous System by the solution of value (2000) and of a Completely Logically Rigorous System by the solution of Complete Automated Software (1996) of the author. However, the best-proven illustration of the Fuzzy Complete Theory is the operational living system (Miller, J. L., & Miller, J. G., 1992; Schrodinger & Penrose, 1974), which, however, is still very far from being understood by scientists of the twenty-first century. The author has extended the concept of Range of Value of the Fuzzy Logic of Zadeh to the new concept of Range of Tolerance and, thus, has expanded the application of Fuzzy Logic beyond science, which is characterized by precision, into post-science. Fuzzy Logic is a post-creational technology, which sacrifices precision in the process of expanding the Range of Tolerance of a creation in order for the creation to survive and flourish for all the possibility

of an uncertain future. Fuzzy Logic extends the vision of knowledge in post-science based on the Exact rigorous solutions in social and life sciences into a new area of knowledge based on Fuzzy Logic as described by Culture Level Quotient (http://els4.net/clq.pdf), and the 16 Methods of Reason below.

Before science or at the level of pre-science, reasons are used to justify conclusions. This can be termed reasoning from conclusion, which is opposite to the original intent of reason toward a conclusion. In the Age of Reason about 300 years ago prior to the current Age of Science, reasoning was free for all, without neither the constraint of prior conclusions nor the laws of nature soon to be discovered in the Age of Science. The scientific way of reasoning by empirical verification depends so much on the faith in the Law of Uniformity (Stanley, 2011) that it is completely dismissed by mathematicians and logicians, especially, after the exposure of Thomas Kuhn (1970) and Paul Feyerabend (1975) that a scientific advancement is akin to a religious conversion, in the past. On the other hand, mathematicians and logicians have been working steadily to find the limit of reliable knowledge. In the current state of knowledge, Kurt Friedrich Gödel holds the most advanced view with his Two Incompleteness Theorems, which conclude that the most reliable of human knowledge, logic, is incomplete and can be shown to be self-contradictory, and, thus, not completely reliable. For example, one can never describe a word completely because every word needs other words to define, and the process goes to infinity and can never be completed. Gödel is further supported by Impossibility Theory of Kenneth Arrow. However, finally, in the last 3 years of Lotfi Zadeh's life, he and the author linked reality to fuzzy logic that fuzzy logic can expand the range of tolerance of knowledge that any incompleteness can be resolved by the Range of Tolerance covering the incomplete part or ignoring the infrequent impossibilities, and, thus, making logic valid, again. The author, Gödel, and Arrow do agree that no matter how rigorous is the method of reason the reason cannot be complete, when the reason is Exact. Fuzzy Logic should be considered the foundation of knowledge, for a solution should be defined as answers within the Range of Tolerance of the solution. With this definition of solution, Fuzzy Logic eliminates the incomplete or the impossible parts of the solution by expanding sufficiently the Range of Tolerance to cover the incomplete part and makes reason complete and, thus, knowledge reliable within the Range of Tolerance. As a simple illustration, a 12-in ruler is impossible to make, but a 12-in +/- 0.1 inch is not.

Fuzzy Logic not only claims that reality is fuzzy, but also speculates that exact reality cannot exist or achieved, as illustrated by the fact that Exact physical objects, with zero Range of Tolerance, cannot be constructed or that an exact convergence scheme sooner or later might go into a dead loop, as often seen in computer convergence systems. Science is precise, social science is fuzzy, and life science is very fuzzy. In particular, life science and medicine should have a foundation based on the Range of Tolerance of life, health, or death.

The Fuzzy Completeness Theory needs to be explained by knowledge beyond science and the hitherto not understandable living system. The solution of value is explained in "Quantitative Supply and Demand Model Based on Infinite Spreadsheet" (Pat. No. 6,078,901). The solution of completely

automated software is explained in “Completely Automated and Self-generating Software System” (Pat. No. 5,485,601). Complete Automation will be achieved through Self-Manufacture General-Purpose Robot with the ability of touch, where the Robot will be developed and controlled by the completely automated software. The solution of touch is the same as the solution of the 300-year-old unsolved contact problem, which has eluded Isaac Newton and all the scientists since Newton and is explained in a book on prolonged contact (http://www.jumpulse.com/jbook.pdf). The solution of touch is based on a Fuzzy Jumpulse Mechanism. Jumpulse is a word coined by Ta-You Wu (1999) to denote a sudden change of force, as Newton’s impulse is a sudden change of momentum. Prolonged contact or touch can be achieved by applying a jumpulse within the Range of Tolerance of a very short interval during impact. Touch is achieved when the two colliding objects have the same position, velocity, and acceleration. The Law of Touch states that acceleration and all higher derivatives can change instantly and is necessary to achieve touch. Ultimately, the Robot will become the human and the software, DNA, as part of the process of the self-creation of the living system. Mankind’s self-creation (Explanation of self-creation, http://www.self-creation.org) will reveal from the design specification the meaning of life and the purpose of existence. From the vision of knowledge of the future, the meaning of life is in its value, and self-creation is the purpose of existence, for what is self-created will be able to do whatever the creator can do. Only after self-creation, the living system can be improved by mankind. The Fuzzy Completeness Theory will be the foundation of Knowledge-Oriented Society (2016).

2. The Sixteen Methods of Reason

The Fuzzy Completeness Theory deals with methods of reason. Before Fuzzy Logic, people use exact reasons as the method to discover truth. And before complete solutions, people arrive at incomplete solutions. For example, the Scientific Method completes reason by introducing the final equation for a deterministic solution, with an equal number of equations and independent variables, from an empirically verified law of nature, which, however, requires the faith in the Law of Uniformity, which states that what happens in the past will happen in the future. Mathematics is more reliable than empirical verification, and logic is even more reliable than mathematics and is the foundation of mathematics. The solution of value identifies an exact complete mathematically rigorous system, which corresponds to reality. The exact solution of completely automated software identifies a complete logically rigorous system, which satisfies the Requirement of Permanence based on complete automation. However, Kurt Gödel and Kenneth Arrow find that logic cannot be complete that is that no matter how long or how exact is the reasoning, there will always be an incomplete part in the chain of reason. Thus, no knowledge can be completely reliable, and their incompleteness and impossibility theorems have made all knowledge incomplete or not completely valid. This incompleteness is a real threat to knowledge, and before the serious study of Fuzzy Logic by Zadeh, no one can resolve this fundamental defect in knowledge.

The author extends Zadeh's concept of Range of Value in Fuzzy Logic to that of Range of Tolerance. Thus, Fuzzy Logic deals with the sacrifice of precision in the process of expanding the Range of Tolerance of a creation in order for the creation to survive and flourish for all the possibility of an uncertain future. In general, Fuzzy Logic defines a solution as all the answers within the Range of Tolerance or the Range of Validity of the solution, thus, allowing the elimination of the incomplete part of reason and making knowledge valid, again. In particular, Fuzzy Exact Solution replaces Exact Solution in mathematics as the most accurate description of reality.

Technically, the Fuzzy Completeness Theory classifies methods of reason formally into 16 Methods of Reason, which represent the technical and applicable description of the Fuzzy Completeness Theory. The 16 Methods are the combination of the 4 basic methods of reasoning: 1) Logic, 2) Mathematics, 3) Empirical Verification, and 4) Others, such as faith, each of which has 2 forms: 1) Incomplete and 2) Complete and two types: 1) Exact and 2) Fuzzy. Thus, the 16 Methods of Reason are in the order of accuracy or reliability, where their possible applications are enclosed in brackets and the question mark denotes unfinished tasks:

1) Fuzzy Complete Logic (Self-Creation of the Living System?)
2) Fuzzy Complete Mathematics (Predictive Social Science?)
3) Fuzzy Complete Empirical Verification (Self-Manufacture Robot?)
4) Fuzzy Complete Other Method of Reason (Religion of Knowledge?)
5) Fuzzy Incomplete Logic (Fuzzy Logic?)
6) Fuzzy Incomplete Mathematics (Fuzzy Mathematics?)
7) Fuzzy Incomplete Empirical Verification (Robot Touch?)
8) Fuzzy Incomplete Other Method of Reason (Theoretical Biology?)
9) Exact Complete Logic (Solution of Software)
10) Exact Complete Mathematics (Solution of Value)
11) Exact Complete Empirical Verification (Science)
12) Exact Complete Other Method of Reason (Religion)
13) Exact Incomplete Logic (Logic)
14) Exact Incomplete Mathematics (Mathematics)
15) Exact Incomplete Empirical Verification (Pre-Science Alchemist)
16) Exact Incomplete Other Method of Reason (Morality)

We see from the above that Fuzzy makes the Method more accurate than Exact, and Complete, than Incomplete. And Fuzzy could be more important than Complete, whose defects, accordingly, are resolved by Fuzzy Logic. The solution derived by Exact Complete Methods is a special case lying within the Range of Tolerance of the solution derived by Fuzzy Complete Methods.

The level of accuracy or reliability in the Method of Reason defines Culture Level Quotient (http://els4.net/clq.pdf), which is intended as a measurement of an individual, a people or a society. For example, in the Age of Morality, the Method of Reasoning is Methods 15 and 16. Religion is the

culmination of morality and uses Methods 12, which was conceived by the wisest thinkers about 2,000 years ago, and was ahead of its time and, whose views have only been surpassed by science, but are still not fully understood. Before the Age of Science, people use Methods 12 to 16 to reason, as Method 13 being used by today's philosophers and logicians, and Method 14, by today's mathematicians. In the current Age of Science, the Scientific Method uses Method 11. Post-science uses Methods 9 for the solution of value in social science and Method 10 for the solution of completely automated software in life and computer sciences. However, Gödel and Arrow would be against the post-science claim of completeness in the solutions of value and software. The solutions are valid only within the Range of Tolerance, allowed by Fuzzy Logic. Methods 1 to 8 can only be speculated, not yet understood, for they deal with new concepts of fuzziness and permanence, being demonstratable only by the living system. Theoretical Biology in Method 8 based on completely automated software might be used to create Artificial Common Sense, which is harder to imitate or to understand than science, mathematics or logic, as evidenced by the unsuccessful results of the Turing Test (Turing, 1950; Mitchell & Ray, n.d.), which has been designed as a test of the common sense of the machine or the computer.

Generally, greater complexity of a problem needs greater rigor for its solution. Life science, dealing with problems with over 500 variables, needs complete logic, such as in DNA represented by 0, 1, 2, and 3 or Completely Automated Software. And social science, dealing with problems with around 50 variables, needs complete mathematical rigor, such as in the solution of value. Science deal with problems with about 5-variable.

Humans and other living things have been created or evolved to take advantage of the Range of Tolerance. Thus far, the fuzziness in nature is not formally studied. Lotfi A. Zadeh was one of the first to stress the possible significance of Fuzzy Logic. Due to the fuzzy nature of many mechanisms, especially, those related to human motions, the application of Fuzzy Logic is performed naturally by humans without being aware of it. Zadeh's Fuzzy Logic and Gödel and Arrow's discoveries of the incompleteness of logic have been largely ignored by the general public. Yet, when it is time for mankind to design efficient mechanical devices, Fuzzy Logic can affect every aspect of the design. For example, Fuzzy Logic is used to produce the 4-stage inverted pendulum by Hong-Xing Li by exploring the Range of Tolerance intentionally (https://www.youtube.com/watch?v=zoWsFyhRnE8https://www.icsi.berkeley.edu/icsi/events/2013/04/hongxing-li-inverted-pendulum). In the future a Fuzzy Jumpulse Mechanism can be used to solve the 300-year-old unsolved practical problem of robot touch or the prolonged contact with double-hitting achieved by the Jumpulse Stroke of tennis or table tennis players (https://www.youtube.com/watch?v=C9PM2x0pqto&t=3s), giving mankind a glimpse into the potential of Methods 7 and 3, in particular, and Fuzzy Logic, in general.

In practice, very few current solutions in social and life sciences satisfy the rigor required for the reliability or predictive capability. And this observation checks with the incapability of these solutions in predicting the recent financial and medical crises, while the post-science solution of value has

predicted both the Savings and Loan Crisis and the Subprime Woe (http://www.postscience.com/fed.htm), due to its complete mathematical rigor, and post-science solution of completely automated software claims the non-solvability of future complexity and medical crises. The only reliable knowledge today is solutions in science, but these solutions address neither the question of value nor the Requirement of Permanence or the fact that the living system is completely automated. All the measurements in knowledge, in general, and in science, in particular, have limiting Ranges of Tolerance or Range of Validity. The Fuzzy Completeness Theory provides both the theoretical and the practical measurements of knowledge based on the Method of Reason.

3. Cultural Level Quotient (CLQ)

Culture Level Quotient (CLQ) measures a person, a people or a nation. Cultural Level Quotient identifies the sum total of a person's cultivation in life or a society's advancement in method of reason; it is a measure of the whole person or a society. Culture Level Quotient corresponds and runs roughly parallel to the Methods of Reason. It provides a non-technical description of the orderly cultural development of human culture as summarized in the following with corresponding Method of Reason:

CLQ Level 0: 500 BC-0 AD Morality to 0 AD-1000 AD Religion (500 BC-1000AD) Method 16

CLQ Level 1: 0 AD-1000 AD Religion to 1000-1600 Pre-Science (0 AD-1000 AD) Methods 12 – 15

CLQ Level 2: 1000-1600 Pre-Science to 1600-2100 Science (1000-2100) Method 11

CLQ Level 3: 1600-2100 Science to 1600-2200 Pre-Social-Science (1600-2200) Methods 11 and 14

CLQ Level 4: 1600-2200 Pre-Social-Science to 2000-2500 Social Science (1600-2200) Methods 10 and 14

CLQ Level 5: 2000-2500 Social-Science to 1600-2600 Pre-Life-Science (1600-2500) Methods 9 and 14

CLQ Level 6: 1600-2600 Pre-Life-Science to 2500-3000 Life Science (1600-3000) Methods 8 and 13

CLQ Level 7: 2500-3000 Life Science to 3000-4000 Robotics (2500-4000) Method 7

CLQ Level 8: 3000-4000 Robotics to 4000-5000 Self-Creation (3000-5000) Methods 3-6

CLQ Level9: 4000-5000 Self-Creation to 5000–6000 Post-Science Fuzzy Logic (4000-5000) Method 2

CLQ Level10:5000-6000 Post-Science Fuzzy Logic to Religion of Knowledge (5000-6000) Method 1

CLQ Level 11: 6000-12000 Religion of Knowledge to Unknown Future (6000-12000) Method Unknown

6000 and beyond: Alien Technology, Universe-Centered Knowledge and Religion of Universe Knowledge.

4. Foundation of Knowledge is Faith, Not Reason

Everyone is brainwashed by the establishment at an early age. A good thinker should be able to realize the brainwashing by the establishment and should start to deprogram oneself as soon as the moment of realization, for human progress is based on the struggle between the thinker and the establishment.

On the other hand, if one does not believe that one has been brainwashed or, as one of the most common phenomena in brainwashing, one believes that one is so smart that one can never be brainwashed by anyone or anything, one is definitely brainwashed. Moreover, the establishment, in order to maintain social stability, generally defends itself, at the expense of progress. Also, most people would prefer to bask in the sunshine and the warmth of the establishment, being financially and socially supported by the establishment for their obedience rather than to live the lives of social outcasts and not being fed naturally by the establishment.

One of the most important phenomena in modern society is the brainwash of nearly 100% of the population in science and the scientific method of empirical verification. Yes, science has exposed the brainwashing of religion, which has at one time brainwashed nearly the entire world and is formed out of necessity by the wisest of human beings to set a code of behavior for the foreseeable future from the time of the establishment of religion. Even today, religion could be a better guidance than science for human and social behavior. Bashing religion by science is understandable simply because science is a newer phenomenon than religion and has the advantage of progress since the founding of religion. One day in the distant future, all the knowledge in religion will be replaced by new discoveries in knowledge, as it is replaced by science in the knowledge of the physical world. The focus of the world in the twenty-first century is how to deprogram ourselves from the success of science and the wonders of technology. Post-science, with its solution of value and of software, claims that the foundation of social science and the foundation of computer science are completely wrong. Social science and life science deal with problem of the entire reality and involve, in particular, infinity. Since infinity never arrives, empirical verification in social and life sciences is not possible. Post-science has realized that the solutions in social science, such as the solution of value, must be accepted based on completely mathematical rigor, and the solutions in life science, such as the solution of completely automated software, of which DNA is a prime example, must be accepted based on completely logic.

Trying to change one's own or anyone else's beliefs acquired through brainwashing is generally as hard as trying to discard something, which one can no longer find. The beliefs are hidden in the subconscious, almost as firmly embedded as one's innate beliefs, such as the Human Associative Memory (HAM) and one's language ability. It would take a lifetime of conscious deprogramming to get rid of these beliefs. Some societies even try purposely to inject young minds with dogmatism, which will benefit the society in the short-run or keep the society stable and united. Well, right or wrong, brainwashing is an effective tool when used by authority, but for all the thinking people, deprogramming throughout one's life should also accompany the brainwashing.

5. Conclusion

This paper deals with the foundation of knowledge. It claims that Fuzzy Logic has resolved the incompleteness of knowledge and made knowledge reliable within the qualification of the most fundamental consideration of the 16 Methods of Reason. In conclusion, even though the world's leading intellectuals have proven, directly, that logic is incomplete and, indirectly, that knowledge is invalid, reality is still functioning in an orderly fashion according to empirically verified laws of nature, and science has even demonstrated the power of knowledge. The direct contradiction between the most reliable knowledge, namely, logic and the real world is resolved by Fuzzy Logic, which introduces the new concept of Range of Tolerance, within which reality can still operate in accordance with the laws discovered by knowledge. In sum, the reality is fuzzy, not exact. The Fuzzy Completeness Theory is a fuzzy proof of the necessity of tolerance in reality. This paper endorses reason, but admits that the foundation of knowledge is faith, not reason. This paper concludes that we must have faith in reason.

6. Breakthrough Impact

The current Age of Science deals with finite duration, within which deterministic data can be obtained for empirical verification. The Age of Science also deals with temporary creations, which differ from the living system designed for permanent existence. Empirical verification is only possible for finite duration and temporary creation and is the bulwark of the scientific method. This paper claims that reality in infinite and permanent. The breakthrough of this paper is the achievement of completeness by infinite consideration and of permanence by fuzzy logic, which sacrifices precision in the expansion of the Range of Tolerance in order to survive permanently in an uncertain future. Postmodern knowledge or post-science (Ching, 2019) is knowledge beyond science for solving problems in social and life sciences, which deals with reality, which is infinite and permanent. In relation to infinity and permanence, the commercial products are described by the names involving infinite or universal and permanent, such as Infinite Spreadsheet, completely automated Universal Permanent Software, Universal Permanent Number, Universal Permanent Money, Universal Permanent Device, Universal Permanent Communication or Intergalactic Communication System for alien technology transfer, and Universal Permanent Education for developing the habit of reason, not memorization.

About the Author

Hugh Ching is the Father of Post-Science based on the solutions of touch, value, and software. Extending the concept of range of value to that of range of tolerance, he becomes the heir to Lotfi A. Zadeh, the Father of Fuzzy Logic. Following the footstep of his mentors Lotfi A. Zadeh, Paul Feyerabend, Ta-You Wu, Kenneth Arrow, Gerard Debreu, Milton Friedman, Tosiyasu L. Kunii, Chittor V. Ramamoorthy, Harold Grad, and K. T. Li, Ching has become the leading thinkers in the fields of their knowledge. Ching realizes that social and life sciences involve the infinite future, and, therefore, solutions in social and life sciences are not subject to empirical verification because infinity,

by definition, will never arrive for collecting the complete set of deterministic data. Ching concludes that solutions in social science must be accepted based on complete mathematical rigor, and that solutions in life science must be accepted based on complete logic. Here, he has implied, for the first time in history, the ultimate usefulness of mathematics and logic. The complete mathematical rigor is demonstrated in his solution to the problem of value posed by Kenneth Arrow and Gerard Debreu in Debreu's book Theory of Value. The complete logic is demonstrated in his solution to complete automation, which characterizes life science. His solution of value is disclosed in the patent Hugh Ching "Quantitative Supply and Demand Model Based on Infinite Spreadsheet" (Pat. No. 6,078,901), which is demonstrated commercially at http://123is.com/verify.htm. His solution of completely automated software is disclosed in the patent Hugh Ching "Completely Automated and Self-generating Software System" (Pat. No. 5,485,601), of which DNA-Protein generation of the living system is a prime example. For DNA and codon sequence representations, Ching originates I Ching Numeral, such as ☷, ☳, ☵, ☱, ☶, ☲, ☴, and ☰ for o to 7, to replace A, C, G, T with base4 and codons with base64 with a 6-level block letter or even semi-synthetic living systems base256 with an 8-level block letter. I Ching Numeral is the most logical and efficient representation of the integer, which is the native language of the machine used in the completely automated software. Thus, I Ching Numeral has been employed in intergalactic communication systems and in Universal Permanent Education for developing the habit of reason, not memorization. Having solved the problem of robot touch with Ta-You Wu using the concept of jumpulse, a sudden change of force, Ching defines a robot as an intelligent machine, which can safely come into contact with the environment, as does the human. The solution of touch is based theoretically on his invention of Generalized Fluid Description in a Generalized Phase Space for plasma physics, where a fluid element moves in the same volume with the same position, the same velocity, and the same acceleration, with the potential of extending all the way to infinite-order derivatives. He originates the concept of self-creation from the observation that the robot with the ability of touch developed and controlled by the completely automated software will ultimately become the human with the software becoming DNA. From the design specification of self-creation, we will realize the meaning of life and the purpose of existence. Ching has extended Zadeh's concept of the range of value in fuzzy Logic to the concepts of the range of tolerance and the range of solutions. In the creation process, precision is sacrificed in order to expand the range of tolerance of the creation to survive and flourish for all the possibilities of an uncertain future. Fuzzy logic should replace logic as the new foundation of knowledge, for a solution should be defined as all the answers lying within the range of validity or tolerance. And, henceforth, Fuzzy Exact Solution should replace the mathematical term of Exact Solution as the most accurate description of reality. Ching is considered the founder of completely mathematically rigorous New Social Science, the founder of the completely logically rigorous New Life Science, the founder of the New Robotics, which will replace all human routine work, the founder of Self-Creation, and the heir to Lotfi A. Zadeh, the Father of Fuzzy Logic.

Hugh Ching receives his B.S., M.S., and Sc.D. degrees in Electrical Engineering and Nuclear Engineering majoring in plasma physics and controlled fusion from the Massachusetts Institute of Technology, Cambridge, MA USA. He received formal mathematical training at the Courant Institute of Mathematical Sciences through postdoctoral collaboration with Prof. Harold Grad, who is a grand student of David Hilbert, and with whose endorsement Ching has vaulted pass science and founded post-science, knowledge beyond science. Ching has formal training in philosophy for 8 years in the Department of Philosophy at the University of California, Berkeley working with Prof. Paul Feyerabend and Prof. Benson Mates. He also has long and close associations with Prof. Gerard Debreu, Prof. Chittoor V. Ramamoorthy, and Lotfi A. Zadeh at UC Berkeley.

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