# Computer Information Library Clusters

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Abstract: Based on creating generalized and hybrid set and library with neutrosophy and quad-stage method, this paper presents the concept of "computer information library clusters" (CILC). There are various ways and means to form CILC. For example, CILC can be considered as the "total-library", and consists of several "sub-libraries". As another example, in CILC, a "total-library" can be set up, and a number of "sub-libraries" are side by side with the "total-library". Specially, for CILC, the operation functions can be added; for example, according to "natural science computer information library clusters" (natural science CILC), and applying "variation principle of library (or sub-library)", “partial and temporary unified theory of natural science so far” with different degrees can be established. Referring to the concept of “natural science CILC”, the concepts of “social science CILC”, “natural science and social science CILC”, and the like, can be presented. While, referreing to the concept of “computer information library clusters”, the concepts of “computer and non-computer information library clusters”, “earth information library clusters”, “solar system information library clusters”, “Milky Way galaxy information library clusters”, “universe information library clusters”, and the like, can be presented.

Key Words: Computer, library, information library, clusters, library clusters, computer information library clusters (CILC), partial and temporary unified theory of natural science so far

## 1 Introduction

In reference [1], generalized and hybrid set can be created with neutrosophy and quad-stage method. In which, generalized and hybrid set are discussed firstly; based on this, the concepts of "problem set", "solution set", "principle set", "law set", "theory set", "formula set", and the like are presented; Secondly the combination or synthetic body of generalized and hybrid sets is named as "library" (various generalized and hybrid sets can be put into the related "library"); such as "mathematics library", "physics library", "natural science library", "social science library", and the like. As for the constitution of "library", referring to quad-stage method and Chinese ancient “Complete Library of Four Branches of Books”, the concept and methodology of a special “Four-library” (including four sub-libraries: information library, question library, correlation library, and achievement library) are proposed. Neutrosophy and quad-stage method can also be used to solve many practical problems within the framework of "set" and "library"; for example, based on the analyses of one “Four-library”, jointly solving problem of advance of planet’s perihelion with partial results of law of gravity and general relativity (these two theories belong to “gravitational theory set”); and jointly expanding “uncertainty principle” to “certainty-uncertainty principle set” (including three principles in different conditions: "certainty principle", "uncertainty principle", and neutral (fuzzy) "indeterminacy principle") with Heisenberg inequality and Ozawa inequality. Finally, with the help of

the concepts of "generalized and hybrid set" and "library", we introduce the concepts of "variation principle of set" and "variation principle of library", and establish a kind of “partial and temporary unified theory of mathematics so far”.

Based on the concept of “library” presented in reference [1], this paper presents the concept of "computer information library clusters" (CILC).

## 2 Constitution of "computer information library clusters" (CILC)

There are various ways and means to form CILC. For instance, CILC can be considered as the "total-library", and consists of several "sub-libraries". The example is the “Four-library” presented in reference [1] (including four sub-libraries: information library, question library, correlation library, and achievement library). As another example, in CILC, a "total-library" can be set up, and a number of "sub-libraries" are side by side with the "total-library". In which, the relationships between "total-library" and "sub-libraries" are also various. In reference [1], the "total-library" may include all or part of the contents (such as directory, abstracts, etc) of sub-libraries. Of course, generally the "total-library" includes part of the contents of sub-libraries only.

## 3 Examples of "computer information library clusters" (CILC)

For the sake of onvenience, only discuss the situation that the "total-library" consists of a number of "sub-libraries". In which, "sub-library" can be divided into "first order sub-library", "second order sub-library", and the like.

Firstly, we discuss "natural science computer information library clusters". If it is seen as the "total-library", then the "sub-library" can be constituted in the following three ways: (1) constituted in accordance with discipline, (2) constituted in accordance with name, (3) constituted in accordance with A to Z sequence.

If constituted in accordance with discipline, the "first order sub-libraries" include: "mathematics library", "physics library", "chemistry library", "biology library", "medicine library", and so on. In "mathematics library", "second order sub-libraries" include: "algebra library", "geometry library", "trigonometry library", "calculus library", and so on.

If constituted in accordance with name, the "first order sub-libraries" include: "Newton library", "Einstein library", "Archimedes library", "Euclid library", "Qian Xuesen library", and so on. In "Newton library", "second order sub-libraries" include: "Newton mathematics library", "Newton physics library", "Newton mechanics library", and so on.

If constituted in accordance with A to Z sequence, the "first order sub-libraries" include: "information library that begin with the letter A" to "information library that begin with the letter Z". In "information library that begin with the letter A", "second order sub-libraries" include: "information library that begin with the letters AA" to "information library that begin with the letters AZ".

Secondly, the "computer information library clusters" (CILC) can also be constituted according to the different requirements and different points of interest. Specially, for CILC, the operation functions can be added.

For example, in reference [2], for unified dealing with the problems of natural science, applying least square method, "partial and temporary unified theory of natural science so far" can be expressed in the following form of "partial and temporary unified variation principle of natural science so far"

$$\Pi_{\mathrm{NATURE}} = \sum_{1}^{n} W_i \int_{\Omega_i} F_i^{\,2} d\Omega_i + \sum_{1}^{m} W_j' S_j^2 = \min_0 \qquad (1)$$

where: the subscript NATURE denotes that the suitable scope is all of the problems of natural science, all of the equations $F_i = 0$ denote so far discovered (derived) all of the equations related to natural science (their suitable scopes are $\Omega_i$), all of the equations $S_i = 0$ denote so far discovered (derived) all of the solitary equations related to natural science (they are suitable on solitary points or in some special cases, the meanings can be found in reference [2]), $W_i$ and $W_j'$ are suitable positive weighted constants, and $\min_0$ was introduced in reference [3], indicating the minimum and its value should be equal to zero.

In this way, the theory of everything to express all of natural laws, described by Hawking that a single equation could be written on a T-shirt, is partially and temporarily realized in the form of "partial and temporary unified variation principle of natural science so far".

However, the disadvantages of such a "partial and temporary unified theory of natural science so far" are also very obvious, namely it is disorganized and lack of layers.

In order to avoid these disadvantages, we introduce some concepts according to the thought of "computer information library clusters" (CILC).

The first one is the concept of "variation principle of library".

The meaning of "variation principle of library" is the variation principle formed by using least square method (LSM) to process all equations and equalities included in the library.

An example to form “variation principle of library of quadratic equation of one unknown” is given below.

The Standard form of quadratic equation of one unknown reads

$$F_1 = 0$$

where： $F_1 = ax^2 + bx + c$

Two root formulas are as follows

$$F_2 = 0$$

where： $F_2 = x_1 - \dfrac{-b + \sqrt{b^2 - 4ac}}{2a}$

And

$$F_3 = 0$$

where： $F_3 = x_2 - \dfrac{-b-\sqrt{b^2-4ac}}{2a}$

Due to the existence of complex solution, the formulas related to complex should also be considered, among which the most famous one is Euler's formula:

$$F_4 = 0$$

where： $F_4 = e^{\pi i} + 1$

Two important equalities related to Euler's formula are as follows

$$F_5 = 0$$

where： $F_5 = \pi - 3.14159265\ \cdots$

And

$$F_6 = 0$$

where： $F_6 = e - 2.718281828\ \cdots$

And so forth.

By using least square method (LSM) to process the equations and equalities related to “library of quadratic equation of one unknown”, we have the following “variation principle of library of quadratic equation of one unknown”

$$\Pi_{\mathrm{QEOOUlibrary}} = \Pi_1 + \Pi_2 + \Pi_3 + \cdots = \min$$

where：the subscript QEOOUlibrary denotes “library of quadratic equation of one unknown”, $\Pi_1 = F_1^2, \Pi_2 = F_2^2, \Pi_3 = F_3^2$, ….

Similarly, for “library of cubic equation of one unknown”, we have “variation principle of library of cubic equation of one unknown” （$\Pi_{\mathrm{CEOOUlibrary}} = \min_0$）; for “library of quartic equation of one unknown”, we have “variation principle of library of quartic equation of one unknown” （$\Pi_{\mathrm{Q'EOOUlibrary}} = \min_0$）; and the like.

In addition, we expand the concepts of equation and solution, and discuss point equation, line equation, plane equation, solid equation, sub-domain equation, whole-domain equation, and the like; as well as point solution, line solution, plane solution, solid solution, sub-domain solution, whole-domain solution, and the like in reference [4]. Accordingly, the concepts of "point equation library", "line equation library", "plane equation library", "solid equation library", "sub-domain equation library", "whole-domain equation library", and the like; as well as "point solution library", "line solution library", "plane solution library", "solid solution library", "sub-domain solution library", "whole-domain solution library", and the like, can be presented. Furthermore, the related "variation principle of library" can be presented also.

For "natural science computer information library clusters" (natural science CILC), applying "variation principle of library", “partial and temporary unified theory of natural science so far” with different degrees can be established as follows

$$\Pi_{NATURAlibrary}=\Pi_{MATHsublibrary}+\Pi_{PHYSsublibrary}+\Pi_{CHEMsublibrary}+\cdots=\min_0 \quad (2)$$

where： $\Pi_{MATHsublibrary}$ is "variation principle of mathematics library", $\Pi_{PHYSsublibrary}$ is "variation principle of physics library", $\Pi_{CHEMsublibrary}$ is "variation principle of chemistry library".

For more applications of "variation principle of library", referring to the examples in reference [1] that solving problem of advance of planet’s perihelion with partial results of law of gravity and general relativity (now, these two theories belong to “gravitational theory library”); and jointly expanding “uncertainty principle” to “certainty-uncertainty principle library” (including three principles in different conditions: "certainty principle", "uncertainty principle", and neutral (fuzzy) "indeterminacy principle") with Heisenberg inequality and Ozawa inequality (now, these two inequalities belong to “inequality library”).

Furthermore, referring to the concept of “natural science CILC”, the concepts of “social science CILC”, “natural science and social science CILC”, and the like, can be presented.

While, referreing to the concept of “computer information library clusters”, the concepts of “computer and non-computer information library clusters”, “earth information library clusters”, “solar system information library clusters”, “Milky Way galaxy information library clusters”, “universe information library clusters”, and the like, can be presented.

## 4 Conclusions

This paper discusses the concept of “computer information library clusters”, as well as other concepts of “information library clusters”. Examples in this paper show that, with the function of operation, “computer information library clusters”, as well as other “information library clusters”, will have a wide range of applications.

## References


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