NEW MATHEMATICS

Based on the generalization of associative models of classical and hypercomplex numbers, governed by distributive properties, models of new, object numbers have been proposed. They are named sady ("gardens").

These are finite sets whose elements take the form of matrices of various dimensions and complex structures. These sets are closed under operations that are, in particular, partially non-associative. They do not possess distributivity, which fundamentally distinguishes them from conventional sets.

They share analogical connections with models of Galois fields and their extensions, surpassing them by the criterion of directly generating functional relationships operating within the set.

From the study of such models, not only nontrivial algebraic laws and new algebras have been found, but also solutions that are unattainable by classical methods. For example, the Pythagorean theorem is generalized within them, and Fermat's problem is resolved in a new way. With a modular multiplication operation and co-modular addition, object sets comply with the Diophantus-Brahmagupta condition.

Analysis shows that they contain the "seeds" of known algebras such as those of Leibniz, Malcev, Seigal, and Akivis… prompting further theoretical development and practical applications.

The absence of distributivity suggests, in the future, a generalization of Gaussian vector space models, as well as Hamiltonian, Clifford, and Grassmann algebras.

Object sets allow the interpretation of numerical magic squares as designs for technological devices capable of producing identical outputs under different conditions. Object-based magic squares are presented not for the sum of elements, but for their product.

Object mathematics "expanded" the 8 trigrams of China to 27 trigrams, enabling the actual formulation of the laws of life by linking mythology with Western analytics.

In these object sets, the theme of "cell" division manifests in new ways: their self-organization algorithm includes the construction of the "shell" of a cell based on its core, given environmental conditions.

Projective geometry is significantly generalized, in which points are replaced by elements of object sets, and lines are defined by various types of functional conditions. Object analogs of Pappus's and Desargues's theorems have been identified.

It has been justified that the finite object geometry of Fano does not comply with Desargues's conditions.

Various argument-invariant functions have been found, including cyclic object exponentials, extending Euler's model.

Models are proposed for generating spectra of associative and non-associative operations, which allow the mathematical modeling of diverse physiological and informational interactions between living systems—systems modeled by these object sets.

Numerous information encoding algorithms are illustrated, along with insights into information control.

The material is presented in a form accessible to many audiences. It could objectively become a catalyst for creative activity among young scientists interested in studying and modeling living systems and the laws of their life.
The proposed viewpoint is that associative operations are more suited to accounting for and describing Bodies and their physiology, while non-associative operations are more relevant to information interaction. From this perspective, object mathematics with complex structural matrices may be seen as a sketch of future mathematics for describing and managing living systems, their Consciousness and Feelings.

A New Quality of Magic Squares in Object Sets

When the elements are denoted by natural numbers M^{16}, the set presents a matrix in the form of a square with a magic number of 10:

$$\begin{pmatrix} 1 & 9 & 11 & 5 \\ 10 & 2 & 6 & 12 \\ 15 & 7 & 3 & 13 \\ 8 & 16 & 14 & 4 \end{pmatrix}.$$

On the one hand, its uniqueness lies in the fact that it contains 4 subset models of 4 elements each, arranged symmetrically within the square, all having a magic number of 10.

On the other hand, the matrix forms a semi-magic square under a non-associative multiplication operation, with row and column results equal to 15, while the diagonals yield 11.

$$\begin{array}{cccccccc} 11 & & 15 & 15 & 15 & 15 & & 11 \\ & \nwarrow & \uparrow & \uparrow & \uparrow & \uparrow & \nearrow & \\ 15 & \leftarrow & 1 & 9 & 11 & 5 & \rightarrow & 15 \\ 15 & \leftarrow & 10 & 2 & 6 & 12 & \rightarrow & 15 \\ 15 & \leftarrow & 15 & 7 & 3 & 13 & \rightarrow & 15 \\ 15 & \leftarrow & 8 & 16 & 14 & 4 & \rightarrow & 15 \\ & \swarrow & \downarrow & \downarrow & \downarrow & \downarrow & \searrow & \\ 11 & & 15 & 15 & 15 & 15 & & 11 \end{array}.$$

Thirdly, the arrangement of elements along the diagonals is unique in terms of the sequential order of natural numbers.

An inverse situation arises in the square of an object set M^{25} with a magic number of 20, representing the object zero of that set:

1	2	3	4	5
6	7	8	9	10
11	12	13	14	15
16	17	18	19	20
22	23	24	25	21

.

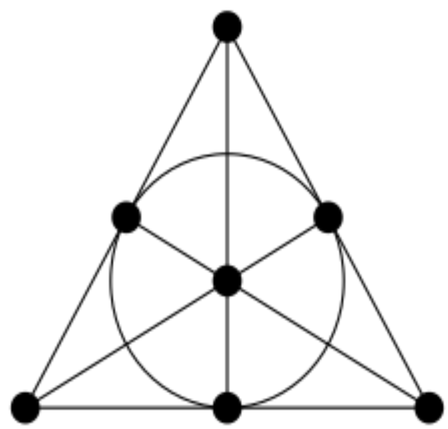
Five elements of this matrix do not generate the element numbered 20 in other selections.

A unique functional law applies exclusively to trigrams within this set: for any selection, a functional law of “preservation” of a specific element holds.

$$a = (a - x)(a + x)(a - x).$$

Finite Object Projective Geometry: The Fano Plane

The arrangement of elements in the standard model of this finite geometry is represented by the following diagram:



This geometry $PG(2,2)$ contains 7 points and 7 lines.

By replacing the points with elements from object sets, we obtain a finite object geometry, provided we ensure operational consistency between them.

				a				
			f		b			
				g				
e				d				c

$\rightarrow$

				9				
			2		11			
				4				
10				12				3

.

For ease of data presentation, we represent them using diagrams. For example:

The functional properties of this geometry are unique:

$$ed = c, \qquad cb = a, \qquad ef = a, \qquad cg = f, \qquad eg = b,$$

$$cd = e, \qquad ab = c, \qquad af = e, \qquad fg = c, \qquad bg = e.$$

The “internal” points are operationally coordinated with one another through other laws:

$$(de)(ef) = b,$$
$$(fa)(af) = g,$$
$$(bc)(cg) = f.$$

Therefore, finite object geometries are not Desarguesian geometries.

There are also additional governing laws.

$$a + d = e + b = c + f.$$

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