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ИСКУССТВЕННЫЙ ИНТЕЛЛЕКТ И НЕКИЙ ПОЧТИ НЕИЗВЕСТНЫЙ АСПЕКТ МАТЕМАТИЧЕСКОЙ ЛИНГВИСТИКИ



Владимир Олегович Лобовиков,

Институт философии и права
Уральского отделения Российской академии наук,
Екатеринбург, Россия,
vlobovikov@mail.ru

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Аннотация

Цель статьи – разработка некоего искусственного языка, могущего быть использованным для математического моделирования той подсистемы естественного языка, которая используется в гуманитарных науках, особенно в ходе якобы бессмысленных разговоров в метафизике, аксиологии, теологии, морали, и т.п. Гуманитарные знания рассматриваются как необходимый аспект всякого интеллекта, в частности, любого искусственного интеллекта (ИИ). Отсюда следует необходимость решения проблемы обнаружения, выделения и уточнения некой до сих пор неизвестной формально-аксиологической семантики естественного человеческого языка для адекватного представления знаний о ценностях человеческой культуры в системах ИИ. В настоящей статье эта проблема рассматривается на примере ее репрезентативного частного случая, а именно, впервые в двузначной алгебре метафизики как формальной аксиологии точно определяются такие математически различные формально-аксиологические значения слова «материя», которые суть не что иное как моральные ценностные функции, зависящие от одного ценностного аргумента. В данной статье

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эти (точно четыре) функции, именуемые «материя», точно определяются с помощью моральных ценностных таблиц. Научная новизна полученных результатов: существование именно четырех математически различных формально-аксиологических значений слова «материя», точно определенных соответствующими ценностными таблицами, до сих пор никогда еще не было осознано. Более того, в работе впервые продемонстрировано, что в точно определенной семантике естественного языка метафизики формально-аксиологическим значением нетривиального утверждения «Эмпирическое познание первой материи есть форма любви к Богу» является некое такое формально-аксиологическое уравнение упомянутой алгебраической системы метафизики, которое дедуктивно обосновано вычислением композиций ценностных функций в соответствии с данными точными определениями. Нетривиальной научной новизной отличается также представленное в этой статье утверждение, что если формально-аксиологическая семантика адекватно моделируется в ИИ, то существует возможность алгоритмического дискурса ИИ-робота о материи, науке, и Боге.

Ключевые слова:

Искусственный интеллект, математическая лингвистика, формально-аксиологическая семантика естественного языка, формально-аксиологическое значение, принцип композициональности, двузначная алгебра метафизики как формальной аксиологии, формально-аксиологические значения слов «материя» и «праматерия», эмпирическое познание, формально-аксиологическое значение термина «любовь к Богу».

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ARTIFICIAL INTELLIGENCE AND AN ALMOST UNKNOWN ASPECT OF MATHEMATICAL LINGUISTICS

Vladimir O. Lobovikov,

Institute of Philosophy and Law of the Ural Branch of the Russian Academy of Sciences,
Ekaterinburg, Russia,
vlobovikov@mail.ru

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Abstract

The paper is targeted at elaborating such an artificial language which could be used for mathematical modeling the subsystem of natural language exploited in the humanities, especially, while seemingly meaningless talks in metaphysics, axiology, theology, morals, etc. The humanities are considered as necessary aspect for any intelligence, in particular, for any artificial intelligence (AI). This implies necessity of solving the problem of discovering, extracting, and explicating a hitherto unknown formal-axiological semantics of natural human language for adequate representation of knowledge of human culture values in AI systems. In this paper the problem is exemplified by its representative particular case, namely, for the first time, in two-valued algebra of metaphysics as formal axiology, such mathematically different formal-axiological meanings of the word “matter” are defined precisely, which (meanings) are nothing but moral-value-functions determined by one moral-value-argument. In the given article, the (exactly four) functions called “matter” are defined precisely by moral-value-tables. Scientific novelty of the results: existence of the exactly four mathematically different meanings of the word “matter” defined precisely by corresponding moral-value-tables has been never recognized hitherto. Moreover, for the first time, it is demonstrated that within the precisely defined formal-axiological semantics of natural language of metaphysics, a formal-axiological meaning of the non-trivial statement “Empirical cognizing the first matter is a form of love to God” is such a formal-axiological equation of the algebraic system of metaphysics which equation is justified deductively by computing compositions of moral-value-functions according to the precise definitions. It is a nontrivial novelty of the results submitted in this paper that, if formal-axiological semantics of natural human language is adequately modeled in AI, then there is a possibility of AI-Robot’s algorithmic discourse of matter, science, and God.

Keywords:

artificial-intelligence, mathematical-linguistics, formal-axiological-semantics-of-natural-language, formal-axiological-meaning, principle-of-compositionality, two-valued-algebra-of-metaphysics-as-formal-axiology, formal-axiological-meanings-of-words-“matter”-and-“primeval-matter”, empirical-cognition, formal-axiological-meaning-of-“love-to-God”.

Introduction

If we had it [a *characteristica universalis*], we should be able to reason in metaphysics and morals in much the same way as in geometry and analysis.

G.W. Leibniz

If controversies were to arise, there would be no more need of disputation between two philosophers than between two accountants (*Computistas*). For it would suffice to take their pencils in their hands, to sit down to their slates (*abacos*), and to say to each other...: Let us calculate (*Calculemus*).

G.W. Leibniz

Certainly, meaning of the word “matter” in natural language of metaphysics is not quite clear even today; vagueness and ambiguity of this philosophical category in general, and of its moral-value-meaning in particular, has been discussed, for example, in (Plato, 1994), (Aristotle, 1994), (Plotinus, 1991), (Augustine, 1961, 1994, 2010). Owing to ambiguity and lack of clarity of moral-value-meaning of “matter” in natural language of metaphysics, during long time in the past, debates of notorious opposition of theology devoted to God and science devoted to empirical knowing material world had been very stormy. Many religious authorities and many celebrated positivist-minded scientists have proclaimed that science and theology are incompatible, as science is nothing but *empirical* knowing the *material* world exclusively. Thus, during long time in the past, proper scientific activity and proper love to God had been separated on principle which (principle) had been transformed into the respectable intellectual tradition (paradigm). I guess that today this concrete separation paradigm is a handicap for progressive development of the complex interdisciplinary program called “Artificial Intelligence” targeted at synthesizing qualitatively different aspects (descriptive-indicative and evaluative-normative subsystems) of intelligence in one system.

During long time in the past, the nontrivial problem of opposition between moral value of faith in God and moral value of scientific investigations of secrets of primeval matter had been extremely controversial and unsolvable (“suspended”) due to lack of sufficiently effective means of solving it and of convincing that the solution is right. Here, first of all, I imply lack of recognizing necessity of existence of exactly *axiological* semantics of natural language and absence of *direct* mathematical modeling the system of *axiology* ignored by the positivist-minded scientists on principle (Carnap, 1931, 1935, 1956, 1967). Today the *descriptive-indicative* semantics of natural languages is well-studied and adequately represented by mathematical models. The *statistical (probabilistic)* aspect of semantics of natural languages is well-studied and mathematically modeled also. Proper formal *logical* semantics (as a branch of *logic proper*) is elaborated as well (Carnap, 1956), (Montague, 1960), (Kripke, 1963, 1965), (Hintikka, 1963, 1969), (Thomason, 1974), (Gabbay and Guenther, 1984), (Epstein, 2001). But up to the present time, discrete mathematical modeling the not-well-recognized *proper axiological* semantics of natural language, which semantics is a branch of *not logic but axiology* (of ethics, jurisprudence, theology, etc.), is a blank to be filled in while progressive developing artificial intelligence.

Hitherto, normally (as a statistical rule), mathematical logic and mathematical linguistics had been never applied *directly (immediately)* to such an *abstract (general) axiology* system which is a *universal* for morals, natural legal law, natural theology, aesthetics, etc. The symbolic modal logics of evaluations and preferences (Ivin, 1970), (McNamara and Van De Putte, 2021) as well as the symbolic modal logics of norms (Ivin, 1973), (McNamara and Van De Putte, 2021) have modeled immediately *proper-logic* aspects of natural language of ethics, and of positive law systems, but, as a rule, the symbolic modal logics (as logics proper) are abstracted from (indifferent to) *proper-axiological* semantics of natural language of morals, theology, and natural legal law. A very interesting investigation of formal-logical aspect of semantics of theology language has been undertaken by P. Weingartner (2021). He has invented and investigated a set of logically formalized axiomatic systems representing natural theology and also the positive (Christian) one. Weingartner’s wonderful

axiomatic theology systems are exactly formulated by means of artificial languages of symbolic logic proper. However, while mathematically modelling axiological aspects of theology, Weingartner does not address to axiology *directly* (immediately), he touches axiology aspect of theology *indirectly* (by means of *proper logic machinery*).

Thus, still, *proper-axiology* semantics of natural language of the humanities has been not recognized as an object of *direct* application of mathematics, and, consequently, has been missed by proper logicians because *subject-matters of formal logic and formal axiology do not coincide*. Nevertheless, in our time, there are some grounds for making deviations and exclusions from this critical picture.

Here, I mean the almost unknown *two-valued algebraic system of formal axiology*, which is defined precisely and discussed in details, for instance, in (Lobovikov, 2011, 2013, 2019, 2021). According to the contemporary view of mathematics proper, mathematics as such is independent from any specific nature of elements of sets, relations among which it studies (Boole, 1854), (Bourbaki, 1950, 1962, 1965, 1998), (Sawyer, 1964), (Pratt, 2021), (Whitehead, 1994). In perfect accordance with the structuralism philosophy of pure mathematics as such, proper universal algebra can be applied to anything. Hence, in principle, a proper algebraic aspect can be discovered in (and extracted from) any arbitrarily taken concrete system, for example, in (from) metaphysics (proper philosophical ontology and epistemology), formal logic, formal ethics, natural jurisprudence, natural theology, et al. Consequently, A.N. Whitehead's paradigm-breaking paper "Mathematics and the Good" (1941) is not an intellectual hooliganism but a well-done representation of the modern structuralist philosophy of proper mathematics, systematically abstracted from any of its possible applications.

In opposition to R. Carnap (1931, 1935, 1956, 1967) and to other positivist-minded philosophers and scientists, who have dreamed of successful utilizing formal-logical analysis of natural human language for complete annihilating metaphysics, axiology and theology as meaningless disciplines, in the given paper, I use a hitherto almost unknown *formal-axiological* analysis of natural human language (and of artificial one) for vindicating and explicating metaphysics, axiology and theology as meaningful subsystems of any intelligence (artificial or natural – it does not matter). Unfortunately, the positivist-minded philosophers and scientists have not recognized that along with the well-known descriptive-indicative semantics (formal-logical one), natural human language has also an almost unknown *formal-axiological* semantics (of the very important *evaluative-normative* aspect of language). I believe that for the real progress in constructing and developing artificial intelligence, the proper formal-logical semantics of natural language must be complemented by the proper formal-axiological one. Substantially to develop further and successfully to finish G.W. Leibniz' research aimed at explication, exact formulation, and rational justification of the natural jurisprudence doctrine (1903, 1952, 1969, 1971, 1981), exactly *proper axiological* formal semantics of evaluative-normative subsystem of natural language of law is to be used systematically. I believe that in accordance with G.W. Leibniz' famous hypothesis (brave intellect project) of a *characteristica universalis*, we should be able to reason not only in metaphysics, morals, and natural legal law, but also in natural theology (vindicated, for instance, in S. Clarke's treatise (1738) "in much the same way as in geometry and analysis").

As the paper has page limit, I have to abstain from giving all the precise definitions making up conceptual basis of the two-valued algebraic system of formal axiology, which (algebraic system) is to be used in this paper. However, for making readers able to check the elementary computations resulting in nontrivial statements of moral values, in this article I have included references to the already published works, in which all the necessary precise definitions of basic terms of two-valued algebra of formal axiology are presented (Lobovikov, 2011, 2013, 2014, 2015, 2019). However, exact definitions of at least some basic notions underlying the paper are to be given here.

The two-valued algebraic system of metaphysics as formal axiology is nothing but a triple $\langle \Phi, \Omega, R \rangle$ in which the sign Φ denotes the set of all such and only such *either-existing-or-not-existing units* which are *either good or bad* ones from the viewpoint of a *valuator* Σ . The sign Σ denotes a person (individual or collective, natural or artificial one – it does not matter), in respect to which all assessments are performed. Certainly, Σ is a *variable*: changing values of Σ can result in changing assessments of concrete elements of Φ . However, if a value of the variable Σ is fixed, then assessments of concrete elements of Φ are quite definite. Elements of Φ are called formal-axiological-objects of metaphysics. The signs “*g*” (good), and “*b*” (bad) stand for *moral values (abstract axiological ones)* of elements of Φ . *Moral actions or persons* (individual or collective, natural or artificial ones – it does not matter) are *concrete instances (particular cases)* of elements of Φ . In $\langle \Phi, \Omega, R \rangle$, the sign Ω denotes the set of all *n-ary algebraic operations* defined on the set Φ . (These algebraic operations are called *formal-axiological ones*.) In the mentioned triple, the symbol R denotes the set of all *n-ary formal-axiological relations* defined on the set Φ . (For instance, the below-defined binary relation “*formal-axiological equivalence*” belongs to R .)

Algebraic operations defined on the set Φ are *moral-value-functions*. *Moral-value-variables* of these functions take their values from the set $\{g \text{ (good)}, b \text{ (bad)}\}$. Here the signs “*g*” and “*b*” denote the values “good” and “bad”, respectively. The moral-value-functions take their values from the same set.

In the talk of *moral-value-functions*, the following mappings are meant: $\{g, b\} \rightarrow \{g, b\}$, if one talks of the functions determined by *one moral-value-argument*; $\{g, b\} \times \{g, b\} \rightarrow \{g, b\}$, if one talks of the functions determined by *two moral-value-arguments* (here “ \times ” denotes the Cartesian product of sets); $\{g, b\}^N \rightarrow \{g, b\}$, if one talks of the functions determined by *N moral-value-arguments*, (here N is a finite positive integer).

In algebra of formal axiology, the signs “*x*” and “*y*” denote *abstract-value-forms* of elements of Φ . (Moral-value-forms of actions and of individual or collective persons are *concrete instances* or particular cases of *abstract-value-forms* of elements of Φ .) Elementary abstract-value-forms deprived of their specific contents represent independent abstract-value-arguments. Complex abstract-value-forms deprived of their specific contents represent abstract-value-functions determined by these arguments. In the present paper, due to the page limit, only some concrete examples of the functions determined by only *one moral-value-argument* are considered. For making acquaintance with many other *moral-value-functions* determined by either *one* or *two moral-value-arguments*, readers are advised to look into (Lobovikov, 2013, 2014, 2015, 2019, 2021).

Results

Now, accepting the presumption that readers have the precise definitions and relevant instantiations of basic notions of algebra of formal axiology at their disposal, I go directly to tabular definitions of such moral-value-functions which are formal-axiological meanings of the natural-language word-combinations: “Empirical Cognition of”; “First Matter (*Materia Prima*) of”; “Second Matter (*Materia Secunda*) of”; “God of”; “Servitude to”; “Love to”, “Faith in”, “Law of”, “Hope for”, “Action on”, “Form of”, etc.

Glossary for the below-placed moral-value table 1. The symbol M_1x denotes the moral-value-function “first matter (universal material) of any x , i.e. such and only such abstract matter of which every x consists”. [In other words, M_1x stands for “absolute materialness of (what, whom) x ”.] The symbol M_2x denotes the moral-value-function “special, particular matter, (specific, singular material) of (what, whom) x ”, or “relative materialness of (what, whom) x ”. M_3x stands for the moral-value-function “special, particular matter (specific, singular material) for (what, whom) x ”, or “relative materialness for (what, whom) x ”. M_4x – the moral-value-function “ x ’s being a universal matter (abstract material) for God of (what, whom) x ”. M_5x – the moral-value-function “movement, change of (what, whom) x ”. M_6x – “self-movement, self-change of (what, whom) x ”. Vx – “violence over x ”, or “action (attack, assault), influence, pressure on x ”. Ex – “empirical cognition of x ”, or “knowing (what, whom) x by experience”. These functions (determined by *one* moral-value-argument x) are defined by the following **table 1**.

Table 1. “Matter”, “Action”, and “Movement” (compiled by the author)

x	M_1x	M_2x	M_3x	M_4x	M_5x	M_6x	Vx	Ex
g	b	b	g	g	b	b	b	b
b	b	g	b	g	g	b	g	g

Thus, there are exactly four one-placed functions called “matter (material), materialness”. Two of them are mutually *opposite* moral-value-constants called (in ambiguous natural language) “*first* matter (*abstract* material)”, or “*absolute* materialness”. In the natural-language-descriptions of these functions, the word “of” indicates the *negative* moral-value-constant-function; the word “for” indicates the *positive* moral-value-constant-function. The other two unary functions called “matter (material)” are such mutually *opposite* moral-value-functions which are *not constants*, therefore, in natural language, it is quite acceptable to call them “*second* matter (*special* material)”, or *relative* materialness”.

Glossary for the below-located moral-value **table 2**. The symbol Bx stands for the moral-value-function “being, existence of (what, whom) x ”. Nx stands for the moral-value-function “nonbeing of (what, whom) x ”. Ax denotes the moral-value-function “absolute being of x ”. Zx – “absolute nonbeing of x ”. Px – “possibility of x ”. Yx – “necessity of x ”. Δx – “freedom of/for x ”. ∇x – “freedom from x ”. Rx – “ x ’s law (rule, order), or law (rule, command) of/by (what, whom) x ”. Cx – “conservation,

preservation, protection, defense of x ". Wx – “world of x ". Ox – “opposite, antagonist, enemy of/for x ". $\odot x$ – “self-contradiction of x ". $\otimes x$ – “(inner) contradictoriness of x ". The mentioned unary functions are defined by the following **table 2**.

Table 2. Ontology as formal axiology (compiled by the author)

x	Bx	Nx	Ax	Zx	Px	Yx	Δx	∇x	Rx	Cx	Wx	Ox	$\odot x$	$\otimes x$
g	g	b	g	b	g	g	g	b	g	g	g	b	b	b
b	b	g	g	b	b	b	b	g	b	b	b	g	b	g

Glossary for the below-located moral-value **table 3**. Gx – constant moral-value-function “God of (what, whom) x in monotheistic universal (world) religions”. Dx – constant moral-value-function “Devil of x , i.e. the principal antagonist of/for God of x , in monotheistic universal (world) religions”. Ix – “ideal (idol), god of (what, whom) x in polytheistic barbaric local religions”. Ux – “daemon, incubus, afrit, evil spirit (evil genius) of/for x in polytheistic barbaric local religions”. Sx – “service, servitude to (what, whom) x ”. Tx – “loyalty, devotion, fidelity to (what, whom) x ”. Fx – “faith, belief in (what, whom) x ”. Hx – “hope for, or trust in x ”. Lx – “love to (what, whom) x ”. Jx – “ x ’s grace, or mercy of/by x ”. $@x$ – “ x ’s gift, or gift of/by x ”. Xx – “fear, derad of (what, whom) x ”. Kx – “kind, form, type, mode, manner, style of (what, whom) x ”. These one-placed functions are defined by the following **table 3**. Some other instances of moral-value-functions determined by *one* moral-value-argument can be found in (Lobovikov, 2013, 2014, 2015).

Table 3. Theology as formal axiology (compiled by the author)

x	Gx	Dx	Ix	Ux	Sx	Tx	Fx	Hx	Lx	Jx	$@x$	Xx	Kx
g	g	b	g	b	g	g	g	g	g	g	g	g	g
b	g	b	b	g	b	b	b	b	b	b	b	b	b

Glossary for the below-placed **table 4**. (The upper index 2 located immediately after a capital letter signals that the indexed letter denotes a function determined by *two* arguments.) The symbol Z^2xy stands for “*choosing and realizing* such and *only such* an element of the pair $\langle x, y \rangle$, which is: 1) *the best* one, if the values of both x and y are positive; 2) *the least bad* one, if the values of both x and y are negative; 3) *the good* one, if the values of x and y are opposite. (Hence, Z^2xy denotes an *excluding choice and realization of only the optimal element* of the pair $\langle x, y \rangle$.) The symbol N^2xy stands for moral-value-function “*realizing neither x nor y* ”. The sign K^2xy denotes moral-value-function “*unity of x and y* ”, or “*realizing both x and y* ”. A^2xy stands for moral-value-function “*realizing a non-excluding-choice, namely, 1) realizing K^2xy if both x and y have positive values, and 2) realizing Z^2xy otherwise*”. D^2xy means “*divorce, separation of x and y* ”. C^2xy – moral-value-function “ *y ’s existence, presence in x* ”. E^2xy – “*axiological equivalence, i.e. identity of the values, of x and y* ”. T^2xy –

“termination, destruction, annihilation of x by y ”. S^2xy – “salvation, conservation, preservation, protection, defense of x by y ”. V^2xy – “ y ’s being without x ”, i.e. “uniting y ’s being with nonbeing of x ”. Y^2xy – “ y ’s contradiction to/with x ”. Some other instances of moral-value-functions determined by two moral-value-arguments can be found in (Lobovikov, 2011, 2019, 2021).

Table 4. Two-placed moral-value-functions (compiled by the author)

x	y	Z^2xy	N^2xy	K^2xy	A^2xy	D^2xy	C^2xy	E^2xy	T^2xy	S^2xy	V^2xy	Y^2xy
g	g	b	b	g	g	b	g	g	b	g	b	b
g	b	g	b	b	g	g	b	b	b	g	b	b
b	g	g	b	b	g	g	g	b	g	b	g	g
b	b	b	g	b	b	g	g	g	b	g	b	b

Now, to begin generating *equations* of the two-valued algebraic system of formal axiology, it is indispensable to give the following precise **Definition 1** of the notion “*formal-axiological equivalence*”.

Definition 1. In the two-valued algebraic system of formal axiology, any moral-value-functions Ξ and Θ are *formally-axiologically equivalent* (this is represented by the expression “ $\Xi=+=\Theta$ ”), if and only if they acquire identical values (from the set $\{g$ (good), b (bad)) under any possible combination of the values of their moral-value-variables.

Definition 2. In the two-valued algebraic system of formal axiology, any evaluation-function Θ is called *formally-axiologically (or necessarily, or universally, or absolutely) good one*, or a *law of algebra of formal axiology* (or a “law of algebra of metaphysics”), if and only if Θ acquires the value g (good) under any possible combination of the values of its moral-value-variables. In other words, the function Θ is *formally-axiologically (or constantly) good one*, iff $\Theta=+=g$ (good).

Definition 3. In the two-valued algebraic system of formal axiology, any evaluation-function Θ is called *formally-axiologically (or invariantly, or absolutely) bad one*, or a “*formal-axiological contradiction*”, if and only if Θ acquires the value b (bad) under any possible combination of the values of its moral-value-variables. In other words, the function Θ is *formally-axiologically (or necessarily, or universally, or absolutely) bad one*, iff $\Theta=+=b$ (bad).

In respect to the binary relation “ $=+=$ ”, it is worth making the following remark. In the ambiguous natural language, very often the relation “ $\Xi=+=\Theta$ ” is represented by the words-homonyms “is”, “means”, “implies”, “entails”, “equivalence”: they may stand for the *formal-axiological equivalence* relation “ $=+=$ ”. As in the natural language the words “is”, “means”, “implies”, “equivalence” also may stand for the logic operations “equivalence” and “implication”, there is an actual possibility of confusions produced by absolute identifying and, hence, substituting for each other the substantially different notions “ $=+=$ ” and logic operation “equivalence” (or “ $=+=$ ” and logic operation “implication”). Such mixing and substituting are prohibited

in algebra of formal axiology: ignoring this prohibition can head to illusions of paradoxes.

Using the above-given exact definitions of notions and functions, any intellectual system (natural or artificial – it does not matter) can produce the following finite (but potentially infinite) succession of formal-axiological equations. The readers are invited to examine all the below-located equations themselves to be confident that they are really valid. To help readers to understand the equations, to the right after each equation immediately after the colon, I place a translation from the artificial language into the natural human one.

1. $Bx=+=VM_2Wx$: being of x is (equivalent to) acting on the material world of x .
2. $Bx=+=M_5M_2Wx$: being of x is (equivalent to) changing the material world of x .
3. $Bx=+=EM_2Wx$: being of x is empirical cognizing the material world of x .
4. $PBx=+=PEM_2Wx$: possibility of x 's being is possibility of empirical cognizing the material world of x .
5. $EM_2Wx=+=Cx$: empirical cognizing the material world of x is conservation, protection, defense of x .
6. $YEM_1x=+=RGx$: necessity of empirical cognition of the first matter is a law (principle, tenet, rule, order) of/by God.
7. $PEM_1x=+=RGx$: possibility of empirical cognition of the first matter is a law (principle, tenet, statute) of/by God.
8. $EM_1x=+=SGx$: science of the first matter is (equivalent to) servitude to God.
9. $EM_1x=+=FGx$: empirical cognizing the first matter is (equivalent to) faith in God.
10. $EM_1x=+=HGx$: empirical cognizing the first matter implies hope for God.
11. $EM_1x=+=LGx$: empirical cognizing the first matter is (equivalent to) love to God.
12. $EM_1x=+=KSGx$: empirical cognition of the first matter is a kind (mode) of servitude to God.
13. $Lx=+=Sx$: love to x is (equivalent to) servitude to x .
14. $Lx=+=Tx$: love to x is (equivalent to) loyalty, fidelity, devotion to x .
15. $EM_1x=+=TGx$: empirical cognition of the first matter means loyalty to God.
16. $EM_1x=+=KLGx$: empirical cognition of the first matter is a manner, style (type) of love to God.
17. $FGx=+=LGx$: Faith in God is (equivalent) to Love to God.
18. $FGx=+=RGx$: Faith in God is a Law (principle, rule, order) of/by God.
19. $FGx=+=@Gx$: Faith in God is a Gift of/by God (Augustine, 1961), (Lupandin, 2002), (Aquinas, 2012).
20. $Ax=+=@Gx$: Absolute (Eternal) Being is a Gift of/by God (Augustine, 1961), (Lupandin, 2002).
21. $XGx=+=RGx$: Fear of God is a Law (principle, rule, order) of/by God.
22. $XGx=+=@Gx$: Fear of God is a Gift of/by God (Lupandin, 2002), (Aquinas, 2012).
23. $HGx=+=@Gx$: Hope for God is a Gift of/by God (Lupandin, 2002), (Aquinas, 2012).

24. $LGx=+=@Gx$: Love to God is a Gift of/by God (Lupandin, 2002), (Aquinas, 2012).
25. $LGx=+=JGx$: Love to God is a Grace of/by God.
26. $LGx=+=RGx$: Love to God is a Law (principle, tenet) of/by God.
27. $FGx=+=HGx=+=LGx=+=Gx$: Faith in God, Hope for God, and Love to God are the One.

As to the compositions containing *two*-placed functions, the following continuation of the above-given list is worth making acquaintance with.

28. $\odot x=+=Y^2xx$: self-contradiction of x is x 's contradiction to/with x .
29. $Y^2xx=+=V^2xx$: x 's contradiction to/with x is x 's being without x .
30. $K^2xOx=+=\odot x$: unity of opposites is a self-contradiction.
31. $E^2xOx=+=\odot x$: identity of opposites is a self-contradiction.
32. $D^2xOx=+=g$: separation of opposites is a formal-axiological law.
33. $Z^2xOx=+=g$: the excluding choice between opposites is a formal-axiological law.
34. $M_2x=+=C^2x\odot x$: materialness of x means existence of a self-contradiction in x .
35. $\textcircled{x}=+=C^2x\odot x$: contradictoriness of x means existence of a self-contradiction in x .
36. $M_2x=+=\textcircled{x}$: materialness of x means contradictoriness of x .
37. $M_1x=+=\odot x$: first (primeval) matter of x is equivalent to self-contradiction of x .
38. $M_6x=+=\odot x$: self-movement of x is self-contradiction of x .
39. $\textcircled{x}=+=Nx$: contradictoriness of x is equivalent to nonbeing of x .
40. $M_2x=+=Nx$: materialness of x is equivalent to nonbeing of x . (Plato, 1994), (Aristotle, 1994), (Plotinus, 1991).
41. $M_5x=+=Nx$: movement of x is equivalent to nonbeing of x (Parmenides, Zeno).
42. $Bx=+=N\textcircled{x}$: being of x means non-contradictoriness of x (Parmenides, Melissus).
43. $Bx=+=N\textcircled{W}x$: being of x means non-contradictoriness of world of x .
44. $M_2Wx=+=\textcircled{W}x$: materialness of world of x is contradictoriness of world of x .
45. $Bx=+=\textcircled{M}_5x$: being of x is contradictoriness of change of x (Parmenides, Zeno).
46. $M_5x=+=\textcircled{x}$: movement, change of x is contradictoriness of x (Parmenides, Zeno).
47. $Bx=+=\textcircled{M}_2Wx$: being of x means contradictoriness of matter of world of x .
48. $Bx=+=\textcircled{M}_5Wx$: being of x means contradictoriness of change of world of x .
49. $Bx=+=M_5M_2Wx$: being of x is equivalent to movement of matter of world of x .
50. $Ax=+=Z^2BxNx$: absolute (proper) being of x is making moral choice between being of x and nonbeing of x .
51. $Z^2xOx=+=RGx$: moral choice between opposites is a law (order, rule) of God.
52. $\Delta Z^2xOx=+=@Gx$: freedom of the choice is a gift of God (Augustine, 1961).

Evidently, there is a heuristically significant *analogy* between the pair of moral-value-functions called "moral choice between x and y " $\langle Z^2xy, A^2xy \rangle$ and the pair

of truth-value-functions (binary logic operations) called “disjunction” (the excluding and the non-excluding ones, respectively). However, the analogy is not an identity relation. The moral choice operations (Z^2xy and A^2xy) are *not arbitrary* acts; they are performed according to the formal-axiological criterion precisely defined by the above-given **table 4**.

Conclusion

Concerning the above-said, it is worth emphasizing the wonderful fact that the equations and their translations into human language are grounded not upon an irrational intuition or revelation but upon a rational algorithmic computation. The nontrivial philosophical statement “Empirical Cognition of the First Matter is a Form of Love to God” is an accurate algorithmic translation (of the relevant equation) to the natural language of *homo sapiens* from the artificial language of actually intellectual robots. Another example of such translating is the sentence “Faith in God, Hope for God, and Love to God are the One”. These algorithmic translations of formal-axiological meanings of the philosophical theology sentences are performed in perfect accordance with the principle of *compositionality of formal-axiological meanings* of word-combinations. Thus, even in domain of the humanities, a sufficiently perfect artificial intelligence system can generate qualitatively novel nontrivial knowledge to be utilized successfully in practical life of human beings or at least to be enjoyed by them.

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Информация об авторе

Владимир Олегович Лобовиков, доктор философских наук, профессор, главный научный сотрудник, Институт философии и права Уральского отделения Российской академии наук, Екатеринбург, Россия, ORCID: <https://orcid.org/0000-0001-8760-0452>, e-mail: vlobovikov@mail.ru

Information about the author

Vladimir Olegovich Lobovikov, Doctor of Philosophical Sciences, Professor, Principal Researcher, Institute of Philosophy and Law of the Ural Branch of the Russian Academy of Sciences, Ekaterinburg, Russia, ORCID: <https://orcid.org/0000-0001-8760-0452>, e-mail: vlobovikov@mail.ru