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NONBEING OF INTERACTION AMONG MONADS AS A FORMAL-AXIOLOGICAL LAW OF A TWO-VALUED ALGEBRAIC SYSTEM OF METAPHYSICS AS FORMAL AXIOLOGY
(Demonstrating the Law by Computing Relevant Compositions of Evaluation-Functions in that Algebraic System)

Introduction

The paper is devoted to constructing a discrete mathematical model of/for G.W. Leibniz' system of metaphysics (especially, monadology)[1] and philosophical theology, especially, the system of universal harmony preestablished by God[2]. For creating the mathematical model, the famous hypothetical idea of *characteristica universalis* has been used. While writing of *characteristica universalis*[3], Leibniz dreamed of effective computation as universal method of/for successful thinking, convincingly proving, and making discoveries in all important spheres of human culture (scientific cognition, metaphysics, moral philosophy, natural theology, natural jurisprudence, aesthetics, etc.). Although, in 20th century, fundamental restrictions for the rationalistic project of philosophizing by algorithmic computing have been discovered (by Alonzo Church, Alan Turing, Emil Post, Kurt Gödel, John von Neumann, Andrey Markov Jr., Stephen Kleene, and other great mathematicians and logicians), the substantially restricted realm of truthfulness of G.W. Leibniz' wonderful hypothetical idea of *characteristica universalis* is not absolutely vacuous: there are many theoretically interesting and practically signi-ficant discoveries to be made in this obviously limited but not empty realm. In the present paper belonging to the evidently limited domain of computational philosophy, I attempt to apply Leibniz' great idea of *characteristica universalis* to his monadology in general and to his genius philosophizing of universal harmony preestablished by God especially. Being occupied by many other activities, Leibniz' did not realize an application of his famous hypothesis of *characteristica universalis* in relation to his original philosophical theology and monadology. Therefore, neither his wonderful metaphysics of monads in general nor his extraordinary theory of preestab-

1 G. W. Leibniz: The *Monadology*, trans. L 643–654. cf. http://home.datacomm.ch/kerguelen/monadology-/monadology.html.

2 G. W. Leibniz: *Theodicy: Essays on the Goodness of God, the Freedom of Man, and the Origin of Evil*, London 1952.

3 G.W. Leibniz: "A Letter to the Duke of Hanover [Pis'mo k gercogu Gannoverskomu]", in: G. W. Leibniz: *Essays in four volumes. V. 3 [Sochineniya v chetyrekh tomah. T. 3]*, Moscow 1984, pp. 491–493 (in Russian); G.W. Leibniz: "Of Universal Science, or Philosophy Calculus [Ob universal'noj nauke, ili filosofskom ischislenii]", in: G.W. Leibniz: *Ibidem*, pp. 494–500 (in Russian).

lished universal harmony in particular are exemplifications (patterns) of *philosophizing by computing* the corresponding compositions of appropriate functions according to precise definitions. The present paper is an attempt to apply Leibniz' motto "*Calculemus*!" to his monadology in general, and to his extraordinary doctrine of universal harmony preestablished by God, especially. The machinery exploited in this article for mathematical modeling Leibniz' conception of monads and the system of preestablished harmony is a two-valued algebraic system of metaphysics considered as abstract formal axiology deprived of its moral, legal, aesthetic, religious and any other concrete contents. Some other applications of the algebraic system of formal axiology to fundamental problems of metaphysics, ethics, jurisprudence, and philosophical theology have been discussed by me during previous International Leibniz Congresses in Hannover, for instance, in the paper[4].

Two-Valued Algebra of Metaphysics as Formal Axiology

The two-valued algebraic system of metaphysics as formal axiology is nothing but a triple $< \Phi, \Omega, R >$ 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 one – it does not matter), in respect to which all assessments are performed. Certainly, Σ is a *variabl*e: changing values of Σ can result in changing assessments of concrete elements of Φ. However, if a value of the variable Σ is perfectly fixed, then assessments of concrete elements of Φ are quite definite (not relative). Elements of Φ are called formal-axiological-objects of metaphysics. The signs "*g*" (good), and "*b*" (bad) stand for *abstract axiological values* of elements of Φ. Moral actions or persons (individual or collective – it does not matter) are concrete instances (particular cases) of elements of Φ. In $< \Phi, \Omega, R >$, 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 *abstract-value-functions*. *Abstract-value-variables* of these functions take their values from the set *{g (good), b (bad)}*. Here the signs "*g"* and "*b"* denote the abstract axiological values "good" and "bad", respectively. The functions take values from the same set.

In the talk of *abstract-value-functions*, the following mappings are meant: $\{g, b\} \rightarrow \{g, b\}$, if one talks of the functions determined by *one abstract-value-*

4 V. O. Lobovikov: "Discrete Mathematical Representing G.W. Leibniz' Philosophy of Law, Morals and Theology by Means of Two-Valued Algebra of the Natural Law (Studying Moral-legal Evaluation-Functions Determined by Two Variables in Algebra of Formal Axiology)", in: H. Breger, J. Herbst, S. Erdner (eds.): *Nature and Subject, Vorträge des XI International Leibniz-Congresses*, Hannover 2011, vol. 2, pp. 611–615.

argument; {g, b}×{g, b} → {g, b}, if one talks of the functions determined by *two abstract-value-arguments* (here "×" denotes the Cartesian product of sets); $\{g, b\}^N \rightarrow \{g, b\}$, if one talks of the functions determined by *N abstract -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 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 this paper, only some abstract-evaluation-functions determined by *one* abstract-evaluation-argument are considered, namely, the functions defined below by table 1, table 2, and table 3.

Glossary for below-placed table 1. In this table, the sign *Bx* stands for the evaluation-function "*being of* (what, whom) *x*". The sign *Nx* stands for the evaluation-function "*nonbeing of* (what, whom) *x*". The symbol *Mx* denotes the function "*monad of* (what, whom) *x*". The symbol *Dx* denotes the function "*different* (what, who) *x*", or "*x*'s being different". D_1x stands for the function "*different from* (what, whom) *x*". *Ix* – the function "*ideal (immaterial), idealness (immaterialness) of* (what, whom) *x*". M_1x – the function "*matter*, *material*, *materialness of* (what, whom) *x*". C_0x – "*x*'s *consciousness*", or "*x*'s being conscious". *Ex* – the function "*external, outer* (what, who) *x*". *Wx* – the function "*x*'s *world*", or "*universe of* (what, whom) *x*". *Ax* – "*action* (attack, assault), influence, pressure *on x*". D_2x – "*dialectics of x*". *Rx* – "*reflection of x*". M_2x – "*many-ness, multitude of x*". *Ux* – "*unity, oneness of x*. *Yx* – "*other (alien to) x*. D_3x – "*division, divisibility, dividedness of x*". These one-placed functions are defined by table 1.

Table 1. The evaluation-functions determined by one evaluation-argument

x	*B x*	*N x*	*M x*	*D x*	D_1 *x*	*I x*	M_1 *x*	C_0 *x*	*E x*	*W x*	*A x*	D_2 *x*	*R x*	M_2 *x*	*U x*	*Y x*	D_3 *x*
g	G	B	g	g	b	g	b	g	b	g	b	B	b	b	g	b	b
b	B	G	b	b	g	b	g	b	g	b	g	G	g	g	b	g	g

Glossary for below-located table 2. Sx – "simple, elementary x", or "simplicity of x". M_3x – "movement, change, flow of x". Lx – "pre-fixed, predetermined, predefined, preestablished (what, who) x", or "x's being preestablished, arranged, settled, well-regulated". M_4x – "movement, change by (what, whom) x", or "x's being a mover". Cx – "compound, complex x", or "complexity of x". Px – "a part of x". W_1x – "x's being a whole". S_0x – "soul of x". B_1x – "body of x". C_1x – "creation of x". C_2x – "creation from x". C_3x – "corruption, disintegration, decomposition of x". I_1x – "impossibility of x". P_1x – "possibility of x". Fx – "finiteness, definiteness, limitedness of x", or **"**finite, definite, limited x". I_2x – "infiniteness, indefiniteness, unlimitedness of x", or **"**infinite, indefinite, unlimited x". Qx – "quality of x".

Table 2. One-placed evaluation-functions

x	S x	M_3 x	L x	M_4 x	C x	P x	W_1 x	S_0 x	B_1 x	C_1 x	C_2 x	C_3 x	I_1 x	P_1 x	F x	I_2 x	Q x
g	G	B	b	g	b	b	g	g	G	g	B	B	b	g	b	g	g
b	B	G	g	b	g	g	b	b	B	b	G	G	g	b	g	b	b

Glossary for below-placed table 3. N_1x – "*necessity of x*", or "necessary (what, who) *x*". N_2x – "*necessity for x*", or "*necessary for* (what, whom) *x*". M_5x – "*mind of* (what, whom) *x*", or "*x*'s *mind*". U_1x – "*universal* (what, who) *x*". U_2x – "*universal for* (what, whom) *x*". L_1x – "*law of* (what, whom) *x*", or "*x*'s *being a law-giver*". L_2x – "*law for x*", or "*x*'s *being regulated by law*". Ox – "*opposite* of/for *x*". Vx – "*contradiction to* (with) *x*". Zx – "*contradiction* (what) *x*". I_3x – "*impenetrability of x*". Z_1x – "(*internal) contradictoriness of x*". R_1x – "*self-regulation of x*". R_2x – "*self-reflection of x*". L_3x – "*law of x for x*". L_4x – "*self-limitation of x*". These functions are defined by table 3.

Table 3. Unary evaluation-functions

x	N_1 x	N_2 x	M_5 x	U_1 x	U_2 x	L_1 x	L_2 x	O x	V x	Z x	I_3 x	Z_1 x	R_1 x	R_2 x	L_3 x	L_4 x
g	G	B	g	g	b	g	b	b	b	b	g	b	b	b	b	b
b	B	G	b	b	g	b	g	g	g	b	b	g	b	b	b	b

Glossary for the below-defined *two-placed* evaluation-functions. (In this paper the upper number-index 2 standing immediately after a capital letter informs that the indexed letter stands for a function determined by *two* arguments.) K^2xy – "*unity (oneness)* of *x* and *y*", or "*joint being* of *x* and *y*", or "*x*'s and *y*'s *being together*". A^2xy – "*action, influence on x* by (what, whom) *y*". I^2xy – "(causal) *interaction* between *x* and *y*". R^2xy – "*reflection*, perception, representation *of x* by (what, whom) *y*". F^2xy – "*interreflection,* inter-perception, inter-representation between *x* and *y*". D^2xy – "*y*'s *being different from x*". M^2xy – "*movement, change, development of x* by *y*". T^2xy – "*termination, annihilation of x* by *y*". C^2xy – "*creation of y from x*". B^2xy – "*being (existence) of y in x*". E^2xy – "*equivalence* of *x* and *y*". S^2xy – "*causing x* by *y*", or "*y*'s *causing*, determining (what, whom) *x*", or "*y*'s being a *cause of/for x*". Z^2xy – "*y*'s *contradiction to (with) x*". H^2xy – "*harmony* (accordance, agreement, conformity) of *x* with *y*". Y^2xy – "*x's being pre-fixed, pre-determined, pre-defined, pre-established by y*". O^2xy – "*organization* of *x* by *y*", or "*x* organized by *y*". L^2xy – "*linkage, bond, connection* of *x* with *y*", or "*x*'s *connection with y*", or "*x*'s *being bound* by y". U^2xy – "*interconnection* between *x* and *y*". V^2xy – "*transformation, conversion, change* of *x* into *y*". W^2xy – "*inter-transformation, interconversion, interchange* between *x* and *y*". J^2xy – "*y*'s *consciousness* of (about) *x*", or "*y*'s being conscious of (about) *x*". X^2xy – "*y*'s *government, management, control over x*", or "*y*'s *governing, directing* (what, whom) *x*". Some of the above-mentioned two-placed functions (majority of them) are defined below by table 4 and table 5. All

the rest ones are to be defined later in this paper *not tabularly but analytically*. (See below analytic definitions DF-4, DF-5 of the functions E^2xy, F^2xy, respectively.)

Table 4: The functions determined by two evaluation-arguments

x	y	K^2xy	A^2xy	I^2xy	R^2xy	D^2xy	M^2xy	T^2xy	C^2xy	B^2xy	S^2xy
g	g	G	b	b	b	b	B	b	B	g	b
g	b	B	b	b	b	b	B	b	B	b	b
b	g	B	g	b	g	g	G	g	G	g	g
b	b	B	b	b	b	b	B	b	B	g	b

Table 5: The two-placed functions

x	y	Z^2xy	H^2xy	Y^2xy	O^2xy	L^2xy	U^2xy	V^2xy	W^2xy	J^2xy	X^2xy
g	g	B	b	b	b	b	B	b	B	b	b
g	b	B	b	b	b	b	B	b	B	b	b
b	g	G	g	g	g	g	B	g	B	g	g
b	b	B	b	b	b	b	B	b	B	b	b

Finishing the formulation of two-valued algebraic system of metaphysics as formal axiology, it is indispensable to provide precise definitions of the notions: "*formal-axiological equivalence*", "*formal-axiological contradiction*", and "*formal-axiological law*" (or, which is the same, "*law of metaphysics*") in the algebraic system under consideration. The mentioned notions are exactly defined as follows.

Definition DF-1 of the binary relation called "*formal-axiological-equivalence*": in the algebraic system of metaphysics as formal axiology, any evaluation-functions Ξ and Θ are *formally-axiologically equivalent* (this is represented by the expression "Ξ=+=Θ"), if and only if they acquire identical values from the set {*g (good), b (bad)*}, under any possible combination of the values of their variables.

Definition DF-2 of the notion "law of metaphysics" (or, which is the same, "*formal-axiological law*"): in the algebraic system under consideration, any evaluation-function Θ is called "*formally-axiologically (or necessarily, or universally, or absolutely) good* one", or a "*law of metaphysics*" (or a "*law of algebra of formal axiology*"), if and only if Θ acquires the value *g (good)* under any possible combination of the values of its evaluation-variables. In other words, the function Θ is *formally-axiologically (or constantly, or absolutely) good* one, iff Θ=+=g (good).

Definition DF-3 of the notion "*formal-axiological contradiction*": in two-valued algebra of metaphysics as 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 evaluation-variables. In other words, the

function Θ is called a "*formal-axiological contradiction*", or a "*formally-axiologically (or necessarily, or universally, or absolutely) bad* evaluation-function", iff Θ=+=b (bad).

Along with the above-used *tabular* definitions of evaluation-functions, it is possible to use *analytic* ones utilizing the above-defined equivalence relation "=+=", for example, the above-mentioned two-placed functions E^2xy – "*equivalence, identity (coincidence)* of *x* and *y*", F^2xy – "*interreflection* of *x* and *y*", and also the here-introduced functions G^2xy – "*mutual harmony* between *x* and *y*", and P^2xy (*penetration of y into x*) are exactly defined *analytically* as follows.

Definition DF-4: $E^2xy=+=K^2B^2xyB^2yx$.

Definition DF-5: $F^2xy=+=K^2R^2xyR^2yx$.

Definition DF-6: $G^2xy=+=K^2H^2xyH^2yx$.

Definition DF-7: $P^2xy=+=B^2yx$.

The below-located formal-axiological equations DF-8, DF-9, DF-10, and DF-11 are precise *analytic* definitions of one-placed evaluation-functions "*self-contradiction* of *x*", "*self-termination* of *x*", "*self-movement (self-change)* of *x*", and "*self-causation* of *x*", denoted by the symbols Hx, Tx, S_2x, Jx, respectively.

Definition DF-8: $Hx=+=Z^2xx$: *self-contradiction* is contradiction of *x* with *x*.

Definition DF-9: $Tx=+=T^2xx$: *self-termination* of *x* is termination of *x* by *x*.

Definition DF-10: $S_2x=+=M^2xx$: *self-movement* of *x* is movement of *x* by *x*.

Definition DF-11: $Jx=+=S^2xx$: *causa sui* (self-causation) is causation of *x* by *x*.

The below-placed formal-axiological equivalences DF-12, DF-13, DF-14, DF-15, and DF-16 are exact *analytic* definitions of unary evaluation-functions "*x*'s *self-direction* (self-government)", "*symmetry* of *x*", "*development* of *x*", "*reflection* by *x* (or *x*'s reflection)", and "*God* (of every *x*) in a monotheistic universe religion", which functions are denoted by the symbols Xx, $\sum x$, D_4x, R_0x, Gx, respectively.

Definition DF-12: $Xx=+=X^2xx$: *x*'s self-government, self-direction (self-control) is government, management, control over *x* by *x*.

Definition DF-13: $\sum x=+=V^2xx$: symmetry of *x* is transformation, conversion, change of *x* into *x*.

Definition DF-14: $D_4x=+=M_3Qx$: development of *x* is change of quality of *x*.

Definition DF-15: $R_0x=+=REWx$: reflection by *x* (or *x*'s reflection) is reflecting external world of *x*.

Definition DF-16: $Gx=+=g$: *God* (of every *x*) *is absolutely good* (this definition models the famous tenet of monotheistic universal theology).

Now, having provided exact definitions of basic notions necessary for understanding the paper, let us start generating such a system of "equations" of compositions of evaluation-functions which is a discrete mathematical model of relevant aspect of Leibniz' monadology and philosophical theology.

Formal-Axiological Equations and Their Translations into Natural Human Language

Owing to the above-provided precise definitions of basic notions and evaluation-functions, readers can generate the following finite (but potentially infinite) list of formal-axiological equations of algebra of metaphysics. To help them to understand the equations quickly and adequately, to the right after every equation (immediately after the colon), an option of translation from the artificial language into the natural one is placed. (It is worth testing all the listed formal-axiological equations for being confident that they are really valid in the algebraic system.)

While examining the below-listed formal-axiological equations and making acquaintance with their translations into the natural human language, it is worth taking into an account the following important linguistic fact. In the gravely ambiguous natural language of humans, very often the *formal-axiological equivalence* relation "=+=" is expressed by the very problematic words "is", "means", "implies", "entails", "equivalence", which are *homonyms*, i.e. *possess qualitatively different meanings* and origins. As in the ordinary human language, the words "is", "means", "implies", "equivalence" may stand for the proper logic operations (binary ones) called "equivalence" and "implication", there is a very high probability of logic-linguistic confusions (*illusions* of grave paradoxes) generated by forbidden substituting for each other the qualitatively different notions, namely, the formal-axiological relation "=+=" and the formal-logic operation "equivalence" (or "=+=" and the formal-logic operation "implication"). Such chaotic blending and substituting are strictly prohibited in the algebraic system of metaphysics as formal axiology. Neglecting this ban heads to allegedly grave paradoxes. Now having the warnings made, let us begin generating the promised list of equations (and of their translations into ordinary language) immediately.

1) $Bx=+=BMx$: being of x is being of monad of x.
2) $Mx=+=x$: monad of x is equivalent to x.
3) $Mx=+=UMx$: any monad x is oneness (unity) of monad x.
4) $Mx=+=NM_2Mx$: any monad x is nonbeing of many-ness of monad x.
5) $Mx=+=D_1Yx$: any monad x is different from any other monad (alien to) x.
6) $Bx=+=BDx$: any x's being is equivalent to x's being different.
7) $BDx=+=D_1D_1x$: x's being different means x's being different from a different from x.
8) $Mx=+=Dx$: any monad x is different one.
9) $Mx=+=Sx$: any monad x is simple one.
10) $Mx=+=NCMx$: a monad implies nonbeing of compound-ness of the monad.
11) $Mx=+=W_1x$: any monad is a whole.
12) $Mx=+=NPx$: a monad implies nonbeing of a part of the monad.
13) $BMx=+=N_1BMx$: being of a monad is necessary being of it.
14) $BMx=+=I_2BMx$: being of a monad is infinite being of it.
15) $BMx=+=I_1C_3Mx$: being of a monad is formally-axiologically equivalent to impossibility of corruption (decomposition, disintegration, dissociation, dissipation) of the monad.
16) $BMx=+=C^2NMxMx$: being of any monad is its *creation* from its nonbeing.

17) $P_1C^2Nxx=+=Ix$: *possibility of creation of x* from its nonbeing is equivalent to idealness (immaterialness) of *x*.
18) $BMx=+=IMx$: being of any monad *x* is equivalent to idealness (immaterialness) of it.
19) $M_1x=+=I_1C^2Nxx$: materialness of *x* is equivalent to *impossibility of creation* of *x* from its nonbeing.
20) $BMx=+=I_1D_3Mx$: being of any monad *x* is equivalent to impossibility of dividing it. In other words, any monad *x* is a proper *atom*.
21) $BMx=+=I_3Mx=+=I_1P^2MxD_1Mx$: being of a monad is equivalent to its impenetrability, i.e. to impossibility of penetration of a monad, which is different from the monad *x*, into the monad *x*.
22) $BMx=+=BI_2M_2xMD_1Mx$: being of monad *x* is equivalent to being of infinite many-ness of monads different from monad *x*.
23) $BMx=+=B^2EWMxI_2M_2MD_1Mx$: being of any monad *x* is equivalent to being of infinite many-ness of such monads, which are different from the monad *x*, in external world (outer universe) of monad *x*.
24) $EWMx=+=M_1WMx$: external world (outer universe) of any monad *x* is material one.
25) $Mx=+=D_1EWMx$: any monad *x* is different from its external world (outer universe).
26) $Mx=+=IMx$: any monad *x* is immaterial (ideal) one.
27) $Ix=+=RMx$: ideal (immaterial) *x* is a reflection (mirroring) of material *x*.
28) $Mx=+=REWMx$: any monad is reflecting (mirroring) the monad's external world.
29) $B^2MxREWMx=+=g$: existence of (reflection of external world of monad *x*) in monad *x* is a law of algebra of metaphysics.
30) $BMx=+=NAMx$: being of any monad *x* means nonbeing of action on it.
31) $BMx=+=I_1AMx$: being of any monad *x* is impossibility of action on it.
32) $I^2MxMy=+=b$: interaction between any monads *x* and *y* is a formal-axiological contradiction.
33) $NI^2MxMy=+=g$: nonbeing of interaction between any monads *x* and *y* is a formal-axiological law.
34) $I_1I^2MxMy=+=g$: impossibility of interaction between any monads *x* and *y* is a formal-axiological law.
35) $I^2M_1B_1xM_1B_1y=+=b$: interaction between material body of *x* and material body of *y* is a formal-axiological contradiction.
36) $I^2M_1B_1xMy=+=b$: interaction between material body of *x* and monad of *y* is a formal-axiological contradiction.
37) $I^2M_1B_1xS_0x=+=b$: interaction between material body of *x* and soul of *x* is a formal-axiological contradiction.
38) $S_0x=+=Mx$: soul of *x* is formally-axiologically equivalent to monad of *x*.
39) $G^2M_1B_1xMx=+=K^2H^2M_1B_1xMxH^2MxM_1B_1x=+=K^2M_1B_1xMx$: harmony (mutual conformity) of material body of *x* and monad of *x* is equivalent to unity (oneness) of material body of *x* and monad of *x*.
40) $K^2M_1B_1xMx=+=b$: unity (oneness) of material body of *x* and monad of *x* is a formal-axiological contradiction.
41) $K^2M_1B_1xS_0x=+=b$: unity (oneness) of material body of *x* and soul of *x* is a formal-axiological contradiction.

42) $G^2M_1B_1xS_0x=+=K^2H^2M_1B_1xS_0xH^2S_0xM_1B_1x=+=K^2M_1B_1xS_0x$: mutual harmony (conformity) of material body of x and soul of x is a formal-axiological contradiction.
43) $G^2M_1B_1xMx=+=K^2H^2M_1B_1xMxH^2MxM_1B_1x=+=K^2M_1B_1xMx$: harmony (mutual conformity) of material body of x and monad of x is a formal-axiological contradiction.
44) $Mx=+=OM_1B_1x$: monad of x is an *opposite* of/for material body of x.
45) $M_1B_1x=+=OMx$: material body of x is an *opposite* of/for monad of x.
46) $K^2xOx=+=b$: unity (oneness) of opposites is a formal-axiological contradiction.
47) $Nb=+=g$: nonbeing of a formal-axiological contradiction is a formal-axiological law.
48) $B^2xb=+=B^2xZy=+=Nx$: being of the contradiction in x is equivalent to nonbeing of x.
49) $M_1x=+=Nx$: matter, materialness of x is equivalent to nonbeing of x (Plato, Aristotle, Augustine).
50) $Bx=+=B^2Nxb=+=B^2NxZy$: being of x is equivalent to being of contradiction in nonbeing of x.
51) $M_1Wx=+=Nx$: material world of x is equivalent to nonbeing of x.
52) $M_1x=+=B^2xZx$: matter, materialness of x is equivalent to being of contradiction in x.
53) $Z_1M_1Wx=+=B^2M_1WaZa$: *internal contradictoriness of* material world of x means existence of contradiction in material world of x.
54) $Bx=+=B^2EWxb=+=B^2EWxZy$: being of x is equivalent to being of contradiction in external (material) world of x.
55) $O^2xx=+=Zx$: self-organization is contradiction.
56) $M^2xx=+=M^2Qxx=+=Zx$: self-movement and self-development are contradictions.
57) $K^2L^2zyL^2yz=+=Zx$: universal interconnection is contradiction.
58) $K^2A^2zyA^2yz=+=Zx$: universal interaction is contradiction.
59) $B^2EWxK^2L^2zyL^2yz=+=Z_1EWx$: being of *universal interconnection* in external world of x means *internal contradictoriness of* external world of x.
60) $B^2EWxK^2A^2zyA^2yz=+=Z_1M_1Wx$: being of *universal interaction* in external world of x means *internal contradictoriness of* external world of x.
61) $B^2M_1WxK^2W^2zyW^2yz=+=Z_1M_1Wx$: being of *universal inter-transformation* in material world of x is equivalent to *internal contradictoriness of* material world of x.
62) $BM_1x=+=B^2EWMxG^2MxM_1B_1x$: being of any monad x is equivalent to being of (mutual harmony of monad of x and material body of x) in external (material) world of monad x.
63) $BMz=+=B^2EWMzG^2MxMy$: being of any monad z is equivalent to existence of mutual harmony between any monads (x and y) in the external world of monad z. As x and y are arbitrarily taken, the mutual harmony among any monads x and y (in the external world of any monad z) is *universal for the world of monads*.
64) $BMz=+=B^2EWMzG^2M_1B_1xM_1B_1y$: being of any monad z is equivalent to existence of mutual harmony between any material bodies (x and y) in the external world of monad z. As x and y are arbitrarily taken, the harmony among any material bodies x and y (in external world of any monad z) is *universal for the world of material bodies*.
65) $G^2xy=+=b$: mutual harmony (conformity) between any (arbitrarily taken) x and y is a formal-axiological contradiction.

66) $BMz=+=B^2EWMzG^2xy$: being of any monad z is equivalent to existence of mutual harmony between any x and y in the external world of monad z. As x and y are arbitrarily taken, harmony among any x and y (in the external world of any monad z) is *universal*. Thus, Leibniz doctrine of existence of *universal harmony* (in external world of any monad) is justified.

Moreover, the above-defined algebraic system of metaphysics is an effective method not only for explicating Leibniz' wonderful monadology, but also for mathematical grounding and justifying his nontrivial philosophical theology[5]. The following three formal-axiological equations are especially interesting in this relation. Also, some additional interesting results of applying the algebraic system of metaphysics to philosophical theology are exposed in the relevant articles[6].

67) $Y^2G^2xyGz=+=g$: *mutual harmony* (between every x and y) *preestablished (prefixed, predefined) by God* (of every z) is a law (formal-axiological one) of algebra of metaphysics.

68) $LG^2xy=+=g$: *predetermined, predefined, preestablished mutual harmony* of any x and y is a law of algebra of metaphysics.

69) $LG^2xy=+=L_1Gz$: the *preestablished harmony among everything in the world is a law of God.*

Knotty Relations among Parmenides, Heraclitus, Plato, Aristotle, Leibniz, Engels, Russel, and Lenin, with Respect to "Dialectics of Matter", from the Viewpoint of Algebra of Metaphysics

The final part of this paper is devoted to criticizing some critical attitudes to Leibniz' ontology, theology and monadology. B. Russel's critique[7] of Leibniz' philosophy is well-known. V.I. Lenin's critique is largely less known. Therefore, to fill in the blank, in this paper I shall talk mainly of Lenin's critical remarks of Leibniz'

5 G. W. Leibniz: *Theodicy: essays on the goodness of God, the freedom of man, and the origin of evil*, London 1952.

6 V. O. Lobovikov: "Analytical Theology: God's Omnipotence as a Formal-Axiological Law of the Two-Valued Algebra of Formal Ethics (Demonstrating the Law by Computing Relevant Evaluation-Functions)", in: *Tomsk State University Journal of Philosophy, Sociology and Political Science* 47/1 (2019), pp. 87–93, https://doi.org/10.17223/1998863X/47/9; V. O. Lobovikov: "Omnipresence of God Proved as a formal axiological law by computing evaluation-functions in two-valued algebra of metaphysics as formal axiology", in: *Discourse-P* 40/3 (2020), pp. 171–185, https://doi.org/10.24411/1817-9568-2020-10311; V.O. Lobovikov: "Epistemic Modal Logic, Universal Philosophical Epistemology, and Natural Theology", in: *Tomsk State University Journal of Philosophy, Sociology and Political Science* 61 (2021), pp. 5–13. https://doi.org/10.17223/1998863X/61/1; V. O. Lobovikov: "Artificial Intelligence and an almost Unknown Aspect of Mathematical Linguistics", in: *Discourse-P* 19/3, (2022), pp. 170–184. https://doi.org/10.17506/18179568_2022_19_3_170.

7 B. Russell: *A Critical Exposition of the Philosophy of Leibniz: With an Appendix of Leading Passages*, Cambridge, 1900.

philosophy of being, God, and monads. In "Philosophical Notebooks" [8], Lenin severely criticized Leibniz and accused him of idealism, fideism, and metaphysics-as-anti-dialectics. In my opinion, Lenin's aggressive critique was a result of his misunderstanding, namely, an outcome of grave logic-linguistic mistake (mortal conceptual confusion). To demonstrate the opinion convincingly, let us move from the habitual natural language of the humanities to the artificial one of the above-constructed discrete mathematical model of metaphysics as formal axiology. Concerning the proper philosophical theory of *being in general*, let us start with discrete mathematical modeling Parmenides' and Heraclitus' "shocking" (at least groundbreaking, challenging, if not crazy) ontology tenets. Such beginning is quite natural and relevant as Lenin has opposed "materialistic dialectics" (keeping in mind Heraclitus[9]) to Parmenides' and Leibniz' idealism and metaphysics-as-anti-dialectics.

70) $Bx{=}{+}{=}Bx$: being is being (in Parmenides' nutshell words: "what is, is").
71) $Nx{=}{+}{=}Nx$: nonbeing is nonbeing (in Parmenides' nutshell words: "what is not, is not").
72) $BNx{=}{+}{=}NBx$: being of nonbeing is nonbeing of being (Parmenides).
73) $Bx{=}{+}{=}NNx$: being is nonbeing of nonbeing (Parmenides).
74) $Bx{=}{+}{=}NZ_1x$: being is nonbeing of inner contradictoriness (Parmenides).
75) $M_3x{=}{+}{=}Z_1x$: movement is inner contradictoriness (Parmenides, Zeno).
76) $Bx{=}{+}{=}NM_3x$: being is nonbeing of movement (Parmenides, Zeno).
77) $M_3x{=}{+}{=}Nx$: movement is nonbeing (Parmenides, Zeno).

Now let us move to discrete mathematical modeling Heraclitus's "shocking" ontology tenets.

78) $B^2M_1WxM_3x{=}{+}{=}$g: being of change, flow of every x (in the material world of x) is a law of metaphysics. In Heraclitus' nutshell words: "Everything flows, changes" (in the material world).
79) $Bx{=}{+}{=}B^2M_1WxK^2yOy$: being of any x is equivalent to existence of unity (oneness) of opposites (in the material world of x).
80) $Bx{=}{+}{=}B^2M_1WxE^2yOy$: being of any x is equivalent to existence of identity (coincidence) of opposites (in the material world of x). In Heraclitus' nutshell words: "Opposites coincide" (in the material world).
81) $K^2xOx{=}{+}{=}Zy$: unity (oneness) of opposites is contradiction.
82) $E^2xOx{=}{+}{=}Zy$: identity (coincidence) of opposites is contradiction.
83) $Bx{=}{+}{=}B^2M_1WxZy$: being of x is equivalent to existence of contradiction in the material world of x.

Owing to the above-given definitions of two-valued algebra of metaphysics, one can recognize and demonstrate convincingly that conjunction of equations modeling the above-mentioned ontology tenets by Parmenides and the above-mentioned ontology tenets by Heraclitus is logically consistent. Now let us move to discrete

8 V. I. Lenin: "Philosophical Notebooks [Filosofskie tetradi]", in: *Complete Collection of Writings by V. I. Lenin. V. 29 [V.I. Lenin. Polnoe Sobranie Sochinenij. T. 29]*, Moscow 1969, pp. 65–76 (in Russian).

9 Ibidem, pp. 303–322.

mathematical modeling F. Engels's ontology tenets formulated in his writings of philosophical materialism and of dialectics as anti-metaphysics[10].

84) $D_2x=+=M_3x$: dialectics of x is movement, change of x.
85) $D_2x=+=D_3x$: dialectics of x is development of x.
86) $Bx=+=M_3M_1x$: being of x is nothing but movement of matter of x.
87) $Bx=+=D_4M_1x$: being of x is development of matter of x.
88) $Bx=+=D_2M_1x$: being of x is dialectics of matter of x.
89) $Bx=+=B^2M_1WxS_2y=+=B^2M_1WxM^2Qyy$: being of x is being of self-movement and self-development in material world of x.
90) $Bx=+=B^2M_1WxO^2yy$: x's being is being of self-organization in material world of x.
91) $Bx=+=B^2M_1WxS^2yy$: x's being is being of *causa-sui* in material world of x.
92) $Bx=+=B^2M_1WxI^2yz$: x's being is being of universal (causal) interaction in material world of x.
93) $Bx=+=B^2M_1WxU^2yz$: being of x means being of universal interconnection in material world of x.
94) $Bx=+=B^2M_1WxW^2yz$: being of x is being of universal inter-transformation in material world of x.
95) $D_2x=+=Z_1x$: dialectics of x means (internal) contradictoriness of x.
96) $Z_1x=+=B^2xZx$: (internal) contradictoriness of x means being of contradiction in x.
97) $D_2x=+=B^2xK^2yOy$: dialectics of x is being of unity of opposites in x.
98) $Bx=+=Z_1M_1Wx$: x's being is equivalent to inner contradictoriness of material world of x.

For typical representatives of the humanities using ambiguous natural language exclusively, it is surprising that conjunction of all the above-listed equations modeling proper philosophical ontology tenets by Parmenides, Heraclitus, Leibniz, and Engels, is consistent (noncontradictory). Proper logic contradictions appear when the certainly wrong equation $Bx=+=M_1x$ is added to the system of equations. Within the algebraic system, the obviously false equation $Bx=+=M_1x$ does not follow logically from the system of relevant definitions given above; the equation can be obtained within the system only by calculation blunder (computation mistake by negligence of an absent-minded person). Agreement with the equivalence $Bx=+=M_1x$ may be used as an exact definition of the formal-axiological meaning of the term "philosophical materialism". As far as K. Marks, F. Engels, and V.I. Lenin have deliberately accepted the equivalence $Bx=+=M_1x$, they may be considered as representatives of proper philosophical materialism. On the contrary, Leibniz is a representative of proper philosophical idealism, the formal-axiological aspect of which is precisely defined in this paper as agreement with the equivalence $Bx=+=R_0x=+=C_0x$ translated by the natural-language sentence "being of x is x's reflection, consciousness". From the above-said it follows logically that proper philosophical idealism rejects any such "dialectical philosophy", which (philosophy) is defined as agreement with the equivalence $Bx=+=Z_1x$. For example, the

10 F. Engels: *Anti-Dühring,* Moscow 1983 (in Russian); F. Engels: *Dialectics of Nature [Dialektika prirody],* Moscow 1950 (in Russian); F. Engels: *Ludwig Feuerbach and the End of Classical German Philosophy* [Lyudvig Fejerbah i konec klassicheskoj nemeckoj filosofii], Moscow 1985 (in Russian).

following quartet of equations was "not compatible" with the Marxism-Leninism's "dialectical philosophy of nature".

99) $K^2W^2zyW^2yz{=}{+}{=}Zx$: universal inter-transformation is contradiction.

100) $NK^2W^2zyW^2yz{=}{+}{=}$g: nonbeing of universal inter-transformation is a law of metaphysics.

101) $Fx{=}{+}{=}Nx$: limitedness of x (i.e. existence of a limit for x) is equivalent to nonbeing of x.

102) $FK^2W^2zyW^2yz{=}{+}{=}$g: existence of a limit for inter-transformations, i.e. limitedness (localness, partialness) of interconversions, is a law of algebra of metaphysics.

This is not a fantastic fairy tale: laws of chemistry limit the alchemy dreams of unlimited transformations of chemical substances; laws of genetics limit the pseudoscientific dialectical dreams of unlimited transformations of biological species: arbitrary conversions of living creatures are impossible. However, it is necessary to be careful while thinking, talking and writing at the intersection of metaphysics (formal axiology) and formal logic of sciences, because, in perfect accordance with "Hume's Guillotine", from any formal-axiological equivalence of evaluation functions, the proper formal logic equivalence of corresponding statements of facts does not follow logically; generally speaking, the gap is unbridgeable. In other words, if α, ω are evaluation functions, and $\Phi\alpha$, $\Phi\omega$ are either true or false fact-establishing statements, affirming that α and ω are factually realized, then the following schemes of arguments are strictly forbidden (they are schemes of logic fallacies). I mean the below-placed argument-schemes, in which $\leftrightarrow$ stands for the binary logic connective "equivalence".

$$\frac{\alpha =+= \omega}{\Phi\alpha \leftrightarrow \Phi\omega} \qquad \frac{\Phi\alpha \leftrightarrow \Phi\omega}{\alpha =+= \omega}$$

These schemes of arguments are not logically valid as the "corollaries" do not follow logically from the "premises". Using such manifestly forbidden logically invalid argument schemes, which violate "Hume's Guillotine", can result in striking logical contradictions with evident facts.

Conclusion

Russel's and Lenin's critical attitudes to Leibniz's metaphysics may be explained by the criticizers' inability to recognize the substantial difference between two kinds of semantics of natural language, namely, between (1) the habitual *descriptive-indicative* semantics of natural language of science (and of everyday human life) and (2) a still-almost-unknown *formal-axiological* semantics of natural language of human discourse in such intellectual disciplines, the very *essence* of which is exactly *evaluative* one, for instance, in morals, religion, theology, and in abstract metaphysics as such. As exactly the still-not-well-recognized *formal-axiological* semantics of natural language is *necessary* for understanding adequately the *evaluative* sentences of ethics, aesthetics, philosophical theology, and abstract metaphysics, often they are misunderstood and, therefore, seem very strange, phantastic, ar-

bitrary. If the still-almost-unknown *formal-axiological* semantics of natural language of aesthetics, ethics, theology, and abstract metaphysics is recognized perfectly and modeled adequately (by the algebraic system of formal axiology), then many seemingly arbitrary statements of Leibniz' metaphysics and theology may be discovered at the tip of a pen as outcomes of *rational philosophizing by accurate computing* appropriate compositions of relevant evaluation-functions according to the exact definitions.