

Recent advances in the modal model checker Meth8 and VL4 universal logic

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In applied and theoretical mathematics, assertions are categorized in alphabetical order as: axiom; conjecture; definition, entry; equation; expression; formula; functor; hypothesis; inequality; metatheorem; paradox; problem; proof; schema; system; theorem; and thesis. We evaluate 532 artifacts in 3001 assertions to confirm 575 tautology and 2426 as *not* (80.8%). We use Meth8, a modal logic checker in five models.

The semantic content or predicate basis of some expressions on their face does not disqualify them from evaluation by Meth8 in classical modal logic. However, the rules of classical logic, as based on the corrected Square of Opposition by Meth8, apply to virtually any logic system. Consequently some numerical equations are mapped to classical logic as Meth8 scripts.

The rationale for mapping quantifiers as modal operators is based on satisfiability and reproducibility of validation of the 24-syllogisms from the corrected Square of Opposition.

Test results are refuted as *not* tautologous, confirmed as tautologous, or neither. For a paradox, *not* tautologous means it is not a paradox, but not necessarily a contradiction either.

The experimental tests used variables for 4 propositions, 4 theorems, and 11 propositions. The size of truth tables are respectively for 16-, 256-, and 2048- truth values, using recent advances in look up table indexing.

The Meth8 modal theorem prover implements the logic system variant VL4 which corrects the quaternary Ł4 of Łukasiewicz. There are two sets of truth values on the 2-tuple {00, 10, 01, 11} as respectively {False for contradiction; Contingent for falsity; Non contingent for truthity; Tautology for proof} and {Unevaluated; Improper; Proper; Evaluated}. The designated *proof* value is T for tautology and E for evaluated. The model checker contains recent advances in parsing technology named sliding window.

The mapping of formulas in Meth8 script was performed by hand, checked, and tested for accuracy of intent. The Meth8 script uses literals and connectives in one-character. Propositions are p-z, and theorems are A-B. The connectives for {and, or, imply, equivalent} are {&, +, >, =}. The negated connectives for {nand; nor; not imply; exclusive-or} are {\, -, <, @}. The operators for {not; possibility $\diamond\exists$; necessity $\square\forall$ } are {\~, %, #}. Expressions are adopted for clarity as: (p=p) for tautologous; (p@p) for contradiction; and (x<y) for $x \in y$. The expression $x \leq y$ as "x less than or equal to y" is rendered in the negative as $\sim(y < x)$ or as $(\sim x > \sim y)$.

Definition	Axiom	Symbol	Name	Meaning	2-tuple	Binary ordinal
1	p=p	T	tautology	proof	11	3
2	p@p	F	contradiction	absurdum	00	0
3	%p>#p	N	non-contingency	truthity	01	1
4	%p<#p	C	contingency	falsity	10	2

Note the meaning of (%p>#p): a possibility of p implies the necessity of p; and some p implies all p. In other words, if a possibility of p then the necessity of p; and if some p then all p.

This shows equivalence of respective modal operators and quantified operators as in Appendix.

For Meth8 an immediate further application is mapping sentences of natural language into logical formulas, so a semi-automation of that linguistic process is near completion.

References

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No.	Name of artifact	Type of artifact	Results with instances
1	ABC	Conjecture	Invalidated(1)
2	Shevenyonov's proof	Conjecture	Invalidated(6)
3	Abductive reasoning	System	Invalidated(1)
4	Abduction, induction, deduction: Peirce	Inference	Invalidated(2) Validated(1)
5	Abstract theory of segments using Prolog	Proofs	Invalidated(15) Validated(3)
6	AGM / Levi and Harper bridging principles	Postulates	Invalidated(7) Validated(3)
7	AGM: remainder sets, paraconsistent revisions	Operators	Invalidated(5)
8	Agnostic hypothesis testing	Hexagon	Invalidated(9) Validated(2)
9	Agnosticism as subset of atheism from no-belief	Conjecture	Invalidated(4) Validated(2)
10	AI: divide the dollar competition	Experiment	Invalidated(1)
11	AI: reduction for scalable deep learning	Algorithm	Invalidated(3)
12	Ackermann's approach to quantifier reduction	System	Invalidated(20) Validated(2)
13	Alcoholics Anonymous BB: We agnostics, p 53	Conjecture	Invalidated(5)
14	Aphorism acceptance inverse expectation	Proportion	Invalidated(1)
15	Contradictory sayings	Paradoxes	Invalidated(4)
16	Alexandroff correspondence	Conditional	Invalidated(3)
17	Analysis as both correct and informative	Paradox	Invalidated(5)
18	Anderson division by zero as nullity	Theorem	Invalidated(3)
19	Approximations of theories	System	Invalidated(1)
20	Arrow's impossibility	Theorem	Invalidated(7)
21	Athanasian creed (Holy Trinity)	Credo	Invalidated(1) Validated(2)
22	Axiomatizing category theory in free logic	Axioms	Invalidated(5) Validated(5)
23	Banach order space, generating positive cone	Definition	Invalidated(2) Validated(1)
24	Banach-Tarski, shorter resuscitation attempt	Paradox	Invalidated(2)
25	Crucial claim in Step 3 of proof, shortest	Paradox	Invalidated(1)
26	Bar recursion	Mapping	Invalidated(2)
27	Barcan	Formula	Invalidated(37) Validated(32)
28	Barwise compactness	Theorem	Invalidated(2)
29	Bayes rule	Rule	Invalidated(11) Validated(11)
30	BCI / BCK algebra	System	Invalidated(5) Validated(3)
31	Bell / CHSH / Spekken toy model	Inequalities	Invalidated(7)
32	A shorter refutation	Theorem	Invalidated(2)
33	A simpler refutation	Theorem	Invalidated(2)
34	Bell's inequality by axiom of empty set	Theorem	Invalidated(2)

No.	Name of artifact	Type of artifact	Results with instances
35	Bogus Bellian logic (BBL)	Theorem	Invalidated(5)
36	Coercive proof	Theorem	Invalidated(2)
37	Coin toss proof	Conjectures	Invalidated(2)
38	Original inequality with assumption	Conjecture	Invalidated(4)
39	Original inequality with assumptions	Conjectures	Invalidated(5)
40	Original inequality and CHSH	Conjectures	Invalidated(6)
41	Positive reasons proof	Theorem	Invalidated(6) Validated(3)
42	Tropical sum	Method	Invalidated(1)
43	Bellman's Lost in the forest problem, solution	Theorem	Validated(4)
44	Berkeley	Paradox	Invalidated(1)
45	Bernstein-Vazirani	Algorithm	Invalidated(4) Validated(1)
46	No-cloning theorem	Theorem	Invalidated(2)
47	Bertrand-Chebyshev theorem / postulate	Theorem	Invalidated(2)
48	Betweenness theory	Axioms	Invalidated(9) Validated(7)
49	BF calculus, Spencer-Brown Primitive arithmetic	System	Invalidated(8)
50	Biscuit conditionals	System	Invalidated(13)
51	Bisimulation, coinduction, Howes' congruence	Proof method	Invalidated(5)
52	Blameworthiness degrees	Coalition	Invalidated(3) Validated(5)
53	Block argumentation	Method	Invalidated(15)
54	Blok-Esakia	Theorems	Invalidated(5)
55	Bogdanov map, 2D conjugate of Hénon map	Formula	Invalidated(1)
56	Born rule	Theorem	Invalidated(6)
57	Exclusivity rule as basis	Theorem	Invalidated(5)
58	Borsuk-Ulam theorem (BUT)	Conjecture	Invalidated(1)
59	Bounded and Σ_1 formulas in PA	Conjecture	Invalidated(1)
60	Bounding modal logics on transitive frames	Conjecture	Invalidated(6)
61	Bourbaki-Moroianu-Tarski fixed point theorem	Theorems	Invalidated(10)
62	Branching quantifier (Hintikka)	System	Invalidated(3)
63	Brouwer fixed point theorem (BFPT)	Conjecture	Invalidated(3) Validated(2)
64	Browder's theorem	Conjecture	Invalidated(1)
65	Buddhist logic	Tetralemma	Invalidated(12)
66	Buridan's Ass	Paradox	Invalidated(11)
67	Buss's bounded arithmetics	Hierachy	Invalidated(6)
68	Cabannas objectivity	Theory	Invalidated(1) Validated(1)

No.	Name of artifact	Type of artifact	Results with instances
69	Hypothesis recast in equational arithmetic	Conjecture	Invalidated(13)
70	Cantor's continuum conjecture, binary injection	Hypothesis	Invalidated(2)
71	Continuum conjecture, interpreted	Hypothesis	Invalidated(3)
72	Diagonal argument	Proof	Invalidated(3)
73	Pairing	Functor	Invalidated(2)
74	Carroll's tortoise and Achilles	Paradox	Invalidated(3) Validated(2)
75	Caswell's significant curriculum issues (1952)	Theorem	Invalidated(5) Validated(1)
76	Causality	Axiom	Invalidated(3) Validated(2)
77	Category composition of morphisms	Definition	Invalidated(1)
78	CC conjecture of Lin Fan Mao	Conjecture	Invalidated(2)
79	Chaitin incompleteness and L constant	Theorem	Invalidated(3) Validated(1)
80	Chinese room argument: Brain Simulator Reply	Conjecture	Validated(3)
81	CHSH inequality	Conjecture	Invalidated(1)
82	Dual reality	Conjecture	Invalidated(1)
83	Church	Thesis	Invalidated(2)
84	Clausius-Clapeyron on spacial dimension	Equation	Invalidated(1)
85	Clifford tori 2D / Kanban cell neuron	Definition	Invalidated(2) Validated(3)
86	Coherence in modal logic	Refutation	Invalidated(1)
87	Collatz (briefest known confirmation)	Conjecture	Invalidated(4) Validated(1)
88	Collection theory as set of all closure sentences	Schema	Invalidated(1)
89	Commutative short circuit on propositional logic	System	Invalidated (1)
90	Complementarity inequality	Refutation	Invalidated(2) Validated(1)
91	Complex (\mathbb{C}), imaginary number rendering	Method	Invalidated(1) Validated(1)
92	Conceptivistic / containment logic: proscription	Systems	Invalidated(3)
93	Conditional logic: improved Adams	Hypothesis	Invalidated(7)
94	Events in QL	Conjectures	Invalidated(8) Validated(1)
95	Conditional necessitarianism	Conjectures	Invalidated(6)
96	Confluence in rewrite systems	Property	Invalidated(3)
97	Connexive logic: Wansing's nightmare	System	Invalidated(2)
98	Aristotle, Boethius justifying connexive	Theses	Invalidated(4)
99	De Finettian logic conditionals	Indicatives	Invalidated(10)
100	Stit logic (see to it that)	System	Invalidated(13)
101	Constructive math: Ishihara tricks onLPO/WLPO	Principles	Invalidated(3)
102	Constructivistic logic	System	Invalidated(14) Validated(2)

No.	Name of artifact	Type of artifact	Results with instances
103	Continuum hypothesis	Conjecture	Invalidated(2) Validated(1)
104	Coq proof assistant	Prover	Invalidated(1)
105	Counterfactual analysis of causation	Reversal	Invalidated(1)
106	Counterpart theory on intensionality logic	Theory	Invalidated(7) Validated(3)
107	Craig interpolation, constructive Fefferman	Theorem	Invalidated(4) Validated(2)
108	Constructive using Maehara's technique	Theorem	Invalidated(7)
109	Creative theories in degrees of unsolvability	Theorem	Invalidated(1)
110	D Ultrafilter contra continuum problem	Equation	Invalidated(1)
111	De Morgan algebras, existentially closed	System	Invalidated(2)
112	Dedekind lattice identity	Axiom	Validated(1)
113	Dempster-Shafer belief and plausibility	Theory	Invalidated(3)
114	Density of all Turing and truth table degrees	Formula	Invalidated(2)
115	Dependent choices (DC) on supercompactness	Axiom	Invalidated(2)
116	Description logic	System	Invalidated(2)
117	Power set POW on of any Ω -model	Operator	Invalidated(4)
118	Unions in descriptively near sets	Operator	Invalidated(6) Validated(2)
119	Dialetheism	System	Invalidated(4)
120	Dialetheism: inconsistent	System	Invalidated(2)
121	Dichotomy of selection	System	Invalidated(1)
122	Disturbance	Feature	Invalidated(4)
123	Diverse double compiling	Schema	Invalidated(1)
124	Domain theory of Dana Scott	System	Invalidated(6)
125	Poset: reflexive, antisymmetric, transitive	Definitions	Invalidated(2) Validated(1)
126	Doxastic logic	System	Invalidated(8) Validated(13)
127	Drinker's paradox	Paradox	Invalidated(1)
128	Dyadic semantics on paraconsistent logic C_1	Approach	Invalidated(4)
129	$E=mc^2$	Theorem	Invalidated(3) Validated(1)
130	EF-axiom: topology and near sets	Axiom	Invalidated(1)
131	Ehrenfeucht-Mostowski indiscernables	Theorem	Invalidated(1)
132	Einstein-Podolsky-Rosen (EPR)	Paradox	Invalidated(1)
133	Elementary constructive set theory (ECST)/CZF	Definitions	Invalidated(6)
134	Entanglement vs untanglement: no-no go-go	Conjecture	Invalidated(28)
135	Enumeration reducibility, degrees, topology	Method	Invalidated(1)
136	Epicurus invoked by Epictetus	Paradox	Invalidated(1)

No.	Name of artifact	Type of artifact	Results with instances
137	Epimenides the Cretan	Paradox	Invalidated(1)
138	Epistemic coalition	Perfect recall	Invalidated(4) Validated(3)
139	Epistemic dynamic reasoning	System	Invalidated(2)
140	Epistemic Hilbert substructure	System	Invalidated(5)
141	Epistemic for knowledge and probability	System	Invalidated(2)
142	Epistemic navigation	System	Invalidated(8)
143	Epistemic quantifiers over agents	Conjecture	Invalidated(8) Validated(12)
144	Erdős-Strauss	Conjecture	Invalidated(1)
145	Ethical reasoning and HOL proof assistant	System	Invalidated(1)
146	Euathlus paradox	Paradox	Invalidated(9)
147	Euclidean geometry embedded in non Euclidean	Conjecture	Invalidated(3)
148	"Ex nihilo": some thing from nothing	Conjecture	Invalidated(4) Validated(4)
149	Fictional logic based on Levi-identity / AGM	System	Invalidated(5) Validated(4)
150	Finite direct powers of ω for modal model	System	Invalidated(1)
151	Fitch's knowability	Paradox	Invalidated(4)
152	Fixedpoint operator mapping mu-calculus	Conjecture	Invalidated(2)
153	FOL disjunctive normal forms (DNF): minimize	FOL Optimizer	Invalidated(2) Validated(1)
154	FOL continuous induction on real closed fields	System	Invalidated(11) Validated(1)
155	FOT first order team logic	System	Invalidated(1)
156	Fodor weaker/stronger, class	Principle	Invalidated(5) Validated(1)
157	Forcing method	Paradoxes	Invalidated(2)
158	Forcing to change large cardinal strength	Theorems	Invalidated(3)
159	Frauchiger-Renner thought experiment	Paradox	Invalidated(5)
160	Frauchiger-Renner thought quantum model	Paradox	Invalidated(14) Validated(2)
161	Fredkin	Paradox	Invalidated(1)
162	Free logic (presupposition) for FOP (implication)	Conjecture	Invalidated(12)
163	Free will argument of Maimonides	Paradox	Invalidated(1)
164	Free will non-existence	Refutation	Invalidated(8) Validated(2)
165	Free will theorem: Clifton-Kochen-Specker	Theorem	Invalidated(1)
166	Free will theorem: FIN axiom	Hypothesis	Invalidated(2) Validated(2)
167	Free will theorem: MIN' axiom	Hypothesis	Invalidated(1)
168	Frequency dependence of mass	Theorem	Invalidated(3) Validated(1)
169	Functions as injective, surjective, bijective	Theorems	Validated(4)
170	Gentzen proof of sequent System G-M	System	Invalidated(6) Validated(2)

No.	Name of artifact	Type of artifact	Results with instances
171	Gettier (justified belief)	Problem	Invalidated(6)
172	GHZ (Greenberger-Horne-Zeilinger)	Experiments	Invalidated(1)
173	Gleason	Theorem	Invalidated(1)
174	Gobbay separation	Theorem	Invalidated(17)
175	Gödel class with identity un-solvable	Conjecture	Invalidated(10) Validated(1)
176	Gödel compactness	Theorem	Invalidated(6) Validated(2)
177	Gödel completeness, shortest	Theorem	Invalidated(2)
178	Gödel first incompleteness	Theorem	Invalidated(4)
179	Gödel incompleteness	Equations	Invalidated(14) Validated(1)
180	Gödel incompleteness FOL	Contradictions	Invalidated(14) Validated(1)
181	Gödel incompleteness theorem	Assistant tools	Invalidated(2) Validated(2)
182	Gödel incompleteness theorem, shortest	Refutation	Invalidated(7)
183	Gödel incompleteness via Löb counter-examples	Refutation	Invalidated(9) Validated(2)
184	Gödel-justification logic	Refutation	Invalidated(7) Validated(2)
185	Gödel-justification subsets	Models	Invalidated(2)
186	Gödel-Löb	Axiom	Invalidated(1)
187	Gödel-McKinsey-Tarski translation of IPC	Theorem	Invalidated(1)
188	Gödel pairing function	Axiom	Invalidated(3) Validated(1)
189	Gödel recursion	Theorem	Validated(1)
190	Gödel-Scott on God	Theorem schema	Invalidated(5) Validated(2)
191	Goldbach's conjectures	Conjectures	Invalidated(8) Validated(2)
192	Goldblatt-Thomason with back/forth duality	Theorem	Invalidated(3)
193	Goodstein (with Ackermannian)	Theorem	Invalidated(3)
194	Graded modal logic	Frame classes	Invalidated(4) Validated(2)
195	Grassmannian (<i>recently discovered</i>)	Paradox	Invalidated(4)
196	Hadamard gate	Theory	Invalidated(3) Validated(1)
197	Hahn-Banach	Theorem	Invalidated(5)
198	Hall	Effect	Invalidated(1)
199	Hamiltonian quaternion	Definition	Invalidated(3)
200	Hardy's generalized paradox	Conjecture	Invalidated(6)
201	Hegel's dialectic	Method	Invalidated(6) Validated(3)
202	Heider inspired international relations theory	Theory	Invalidated(5) Validated(1)
203	Heisenberg uncertainty principle	Axiom	Invalidated(2)
204	Conjecture	Principle	Invalidated(1)

No.	Name of artifact	Type of artifact	Results with instances
205	Replacement theorem	Axiom	Invalidated (2) Validated(3)
206	Take a picture of an electron	Principle	Invalidated(6) Validated(2)
207	Henkin cyclic algebra and FOL applications	Axioms	Invalidated(8) Validated(6)
208	Permutation model nonrepresentable	Assertion	Invalidated(1)
209	Herbrand semantics	System	Invalidated(6)
210	Heyting algebra	Algebra	Invalidated(21)
211	Heyting-Brouwer intuitionistic logic	Systems	Invalidated(9) Validated(1)
212	Heyting logic	Idempotency	Invalidated(2) Validated(1)
213	Hexagons of opposition for statistical modalities	Conjectures	Invalidated(9) Validated(1)
214	Higher-order mathematical induction	Principle	Invalidated(2) Validated(1)
215	Hilbert H10 undecidable: extended to Q in R	Problem	Invalidated(6) Validated(4)
216	Hilbert generalization	System	Invalidated(1)
217	Hilbert grand hotel	Paradox	Invalidated(1)
218	Hilbert / Kolmogorov intuitionistic logic	Systems	Invalidated(9)
219	Horty's puzzles in stit logic	Corollaries	Invalidated(3) Validated(3)
220	Huemer's confirmation theory for induction	Proposal	Invalidated(3) Validated(2)
221	Huhn 2-distributive lattice identity	Formula	Invalidated(1)
222	Hydraulic forgiveness (confirmed)	Theorem	Invalidated(6) Validated(2)
223	Hydraulic corollary of peace	Corollary	Validated(1)
224	Hypersequent calculus for modal logic S5	System	Invalidated(2)
225	Ideals	Definition	Invalidated(4)
226	Ignorance of first choice	System	Invalidated(3)
227	Imaginary numbers	Definition	Invalidated(2)
228	Imperative logic	System	Invalidated(3) Validated(4)
229	Implication combination forms from $(p \supset r) \supset r$	Theorems	Invalidated(3) Validated(16)
230	Impossible worlds: none necessary; all possible	Definitions	Invalidated(4) Validated(4)
231	Inclusion, dependence, independence logics	Theorem	Invalidated(1)
232	Inconsistent theory	Theorem	Invalidated(6) Validated(2)
233	Extending the monad to a triad	Formulas	Invalidated(10) Validated(2)
234	Kunen inconsistency	Theorem	Invalidated(1) Validated(1)
235	Independence-friendly logic (Kreiselization)	System	Invalidated(2)
236	Indicative conditionals	Encyclopedia entry	Invalidated(5) Validated(1)
237	Induction: Black raven (swan); Kripkenstein	System	Invalidated(3)
238	Induction: New riddle	Paradox	Invalidated(2)

No.	Name of artifact	Type of artifact	Results with instances
239	Induction, coinduction: standard and mutual	System	Invalidated(4)
240	Induction in Elem. Arith. for reduction property	Formulas	Invalidated(2)
241	Inequality: 'arbitrarily' vs 'sufficiently large	Conjecture	Invalidated(2) Validated(1)
242	Infinite set theory	Theorem	Invalidated(2)
243	Information theory: mutual information	Definition	Invalidated(4)
244	Internal logic of extensive restriction categories	Duality	Invalidated(3)
245	Interval logic for model checking	System	Invalidated(3)
246	Intuitionistic Zermelo-Fraenkel set theory (IZF)	Axioms	Invalidated(10)
247	Isabelle/HOL prover assistant	System	Invalidated(1)
248	Jaccard index	Statistic	Invalidated(3)
249	Jensen polynomial partition roots for Riemann	Hypothesis	Invalidated(1)
250	Join-prime in lattice theory	Definition	Validated(1)
251	Jonsson positive logic: retromorphism	System	Invalidated(3)
252	k -triangular set function logic	Definition	Validated(1)
253	Kanban cell neuron maps whole brain	Model	Invalidated(242)Validated(14)
254	Kant: falsity of syllogistic figures	Theorems	Invalidated(8) Validated(2)
255	Karpenko, S.A.	System K-L4	Invalidated(6) Validated(8)
256	Keisler measure in NIP theory	Formula	Invalidated(1)
257	King algebras on rough set concept analysis	Algebra	Invalidated(5)
258	Kleene lattices, reversible	Axiomization	Invalidated(3) Validated(1)
259	Kramers-Kronig	Relation	Invalidated(1)
260	Kripke-Platek and CZF	Set Theory	Invalidated(1)
261	Kuratowski–Zorn lemma (Zorn's lemma)	Lemma	Invalidated(1)
262	Lachlan problem solution	Problem	Invalidated(4)
263	Lambda λ -calculus and LISP	System	Invalidated(7) Validated(1)
264	Lattice effect algebra	Conjecture	Invalidated(1)
265	Lean prover from Microsoft	System	Invalidated(3)
266	Leibniz' ontological proof	Proof	Invalidated(1) Validated(1)
267	Briefest known ontological proof of God	Proof	Validated(2)
268	Lemmon D	Axiom	Invalidated(1)
269	van Leunen deformation field	Conjecture	Invalidated(4)
270	van Leunen lattice logic, weak modular	Theorem	Invalidated(2)
271	Liar	Paradox	Invalidated(5)
272	Liar's antimony	Paradox	Invalidated(7)

No.	Name of artifact	Type of artifact	Results with instances
273	Prior rendition	Paradox	Invalidated(4)
274	Kripke rendition	Paradox	Invalidated(1)
275	Line through a circle	Conjecture	Validated(1)
276	Linear algebra	Theorems	Invalidated(4)
277	Linear programming: Kharun-Kush-Tucker	Conditions	Invalidated(4)
278	Liouville	Theorem	Invalidated(2) Validated(1)
279	Löb original, corrected	Theorem	Invalidated(1) Validated(1)
280	Löb with Gödel incompleteness	Theorems	Invalidated(3)
281	Lobachevskii non Euclidean geometry	Consistency	Invalidated(1) Validated(1)
282	Lonely runner	Conjecture	Invalidated(8) Validated(1)
283	Löwenheim–Skolem	Theorem	Invalidated(5)
284	Löwenheim–Skolem, Hilbert style	Metatheorem	Invalidated(4)
285	Luce model (general)	Definitions/axioms	Validated(5)
286	Łukasiewicz nightmare: $(\diamond p \& \diamond q) \rightarrow \diamond(p \& q)$	Allegation	Invalidated(4) Validated(3)
287	Łukasiewicz modal Ł4	Objections	Invalidated(8) Validated(1)
288	Lusin's separation	Theorem	Invalidated(2)
289	Lyndon interpolation and GL	Interpolation	Invalidated(8) Validated(1)
290	Majorana's 'root'	Equations	Invalidated(9)
291	Malice and Alice	Puzzle	Invalidated(7)
292	Matita prover superposition	Algorithms	Invalidated (3)
293	Mereology, behavioral	System	Invalidated(2)
294	Mereotopology, distributive	Relations	Invalidated(9)
295	Metaphysics: "Something rather than nothing"	Problem	Validated(2)
296	Meth8/VŁ4 self-proof in one variable	Theorem	Validated(8)
297	Meth8 versus Prover9 via Lifshitz	Problem	Validated(1)
298	Minimalist foundation (MF) via Church's thesis	System	Invalidate(1)
299	Minkowski plane, classical set of points/cycles	Theorems	Invalidated(2) Validated(1)
300	Modal aleatoric calculus	System	Invalidated(6)
301	Modal coalgebraic geometric logic	System	Invalidated(2)
302	Modal logics: 2; 3; 4; B; D; E; K; M; T; and W	Systems	Invalidated(2) Validated(8)
303	Modal GL ₂	Logic	Invalidated(8) Validated(1)
304	Model theory=univ. algebra + mathematical logic	Language	Invalidated(1)
305	Modern modal logics (2): JYB4 and AR4	Axioms	Invalidated(12) Validated(17)
306	Modified divine command	Theory	Invalidated(4) Validated(1)

No.	Name of artifact	Type of artifact	Results with instances
307	Modus ponens consequent as conditional	Rule	Invalidated(3) Validated(1)
308	Molyneux's problem	Problem	Invalidated(1)
309	Moore's paradox	Paradox	Invalidated(2) Validated(1)
310	Moral absolutism impossible	Conjecture	Invalidated(3) Validated(1)
311	Relativity of moral absolutism	Conjecture	Invalidated(2) Validated(1)
312	Most	Quantifier	Invalidated(2)
313	Necessitation: K,T,4,B,D,5; <i>D,M,S4,B,S5</i>	Axiom	Invalidated(10) Validated(7)
314	Leonard Nelson's criticism of epistemology	System	Invalidated(2) Validated(2)
315	von Neuman-Bernays-Gödel [NBG]	Theory	Invalidated(2) Validated(3)
316	Neutrosophic logic	Theorems	Invalidated(5)
317	Dezert-Smarandache	Theory	Invalidated(2)
318	Generalized Hegel's dialectics	Method	Invalidated(4)
319	Generalized intuitionistic, fuzzy logic	System	Invalidated(2)
320	Geometry of Smarandache / Lin Fan Mao	Definition	Invalidated(2)
321	MANET attack genetics	Algorithm	Invalidated(1)
322	Negated adjectival phrases	Lattices	Invalidated(2)
323	Neutrosophic logic: theory of everything	Theorem	Invalidated(2)
324	Neutrosophic sets	Properties	Invalidated(3)
325	Neutrosophy with dependent probability	Definitions	Invalidated(3) Validated(2)
326	Quinary	System	Invalidated(2)
327	Retract crisp set topology	Propositions	Invalidated(5)
328	Smarandache multi-space theory	System	Invalidated(5)
329	Soft lattice theory	Theorem	Invalidated(2)
330	Unification of other logics	Axioms / Rules	Invalidated(2)
331	Values as 1, 0, between 0 and 1	Designated logic	Invalidated(2)
332	Vector space on $\{-0, 0, 0 < p < 1, 1, 1+\}$	Multi-valued logic	Invalidated(3)
333	Newcomb's game	Paradox	Invalidated(2)
334	Non-deterministic logic	Completeness	Invalidated(8)
335	Nothing does not imply a non existent null set	Definition	Invalidated(7)
336	Nucleosynthesis	Definitions	Invalidated(4)
337	Optimization for complex number programming	Conjecture	Invalidated(1)
338	Ordinal notation via simultaneous definition	Conjecture	Invalidated(5)
339	Ordinal Turing machine (OTM) on set theory	Conjectures	Invalidated(3)
340	Overlap algebra on constructive Boolean algebra	Conjecture	Invalidated(4)

No.	Name of artifact	Type of artifact	Results with instances
341	P=NP; 3-SAT	Conjectures	Invalidated(5)
342	Paraconsistency, machine-assisted view	Axioms	Invalidated(2) Validated(3)
343	Paraconsistent contradiction	Conext	Invalidated(4)
344	Paradox refutation reduced to one variable	Method	Invalidated(3) Validated(9)
345	Parikh's logic G and completeness of system Par	Axiomatization	Invalidated(3)
346	Partial awareness	System	Invalidated(8) Validated(1)
347	Pascal's wager thought experiment	Theorem	Invalidated(4) Validated(1)
348	Pauli exclusion	Principle	Invalidated(4)
349	Peano arithmetic 9, 1-8	Axioms	Invalidated(1) Validated(8)
350	PŁ4	System	Invalidated(10)
351	Playfair axiom	Axiom	Validated(1)
352	Plonka sums of inclusive consequence relations	Inclusion	Invalidated(1)
353	Poincaré recurrence theorem	Theorem	Invalidated(2)
354	Poison modal logic (PML)	System	Invalidated(4)
355	Karl Popper on God	Proof	Invalidated(4) Validated(14)
356	PowerEpsilon mathematical induction	Axiom	Validated(1)
357	Pratt-Floyd-Hoare logic correctness	System	Invalidated(5)
358	Preference profiles	Algorithm	Invalidated(6)
359	Prevarieties and quasivarieties of logic	Monoids	Invalidated(4)
360	Prenex normal format	Rules	Invalidated(11) Validated(3)
361	Shortest refutation based on implication	Rules	Invalidated(2) Validated(2)
362	Presburger arithmetic	System	Invalidated(3)
363	Presupposition different from entailment	Conjecture	Invalidated(3)
364	Prisoner's paradox	Paradox	Invalidated(3)
365	Provability logic GL, Japaridze polymodal GLP	Logics	Invalidated(8)
366	Prover9 vs Meth8 differences	System	Invalidated(6)
367	Pure alethic modal logic	System	Invalidated(1) Validated(1)
368	Quantifiers and operators	Connectives	Invalidated(12)
369	Quantum arithmetic for repeat-until-success	Circuits	Invalidated(2)
370	Block chain	Cryptography	Invalidated(1)
371	Classical logic as completion of QL	System	Invalidated(16) Validated(6)
372	Control by observation	System	Invalidated(1)
373	Entanglement	Conjecture	Invalidated(5)
374	Gates correspond to logical operators	Theorems	Invalidated(4) Validated(1)

No.	Name of artifact	Type of artifact	Results with instances
375	Gates refuted	Theorems	Invalidated(8) Validated(1)
376	Gedanken experiment	Conjectures	Invalidated(8)
377	Logic	System	Invalidated(17) Validated(2)
378	Masking	Conjectures	Invalidated(5) Validated(2)
379	Probability	Axiom	Invalidated(1)
380	Probability	Rule	Invalidated(2)
381	Simulation of Hamiltonian spectra	Operator	Invalidated(1)
382	Spin-statistics	Theorem	Invalidated(4) Validated(4)
383	Superposition as the red herring	Conjecture	Invalidated(3)
384	Superposition disproves Schrödinger cat	Conjecture	Invalidated(5) Validated(2)
385	Ternary probability of qutrit	Hypothesis	Invalidated(3)
386	Three lights experiment of qutrit	Conjecture	Invalidated(1)
387	Questions and answers	Problem	Invalidated(4) Validated(1)
388	Ramsey's theorem/ Pythagorean triple of integers	Theorem	Invalidated(8)
389	Ranjan, A.	Problem	Validated(2)
390	Rational emotive behavior therapy (REBT/LBT)	Systems	Invalidated(16)
391	Rauszer 'concrete' Boolean algebra by preorder	Systems	Invalidated(13)
392	Realizability semantics for QML	Theorems	Invalidated(3)
393	Reichenbach common cause / event-splitting	Principle	Invalidated(6) Validated(3)
394	Relativization (structural induction) in weighting	Method	Invalidated(1)
395	Relevance logic	System	Invalidated(7)
396	Definition in R	Model	Invalidated(2)
397	Reverse mathematics: recursive comprehension	Principle	Invalidated(10) Validated(2)
398	Measurability and computability	Theory	Invalidated(1) Validated(2)
399	Nets	Conjectures	Invalidated(4)
400	Riemann: only zeroes at 0, 1/2	Hypothesis	Invalidated(1)
401	Excluded middle	Conjecture	Invalidated(4)
402	Extended complex numbers on sphere	Operators	Invalidated(3) Validated(2)
403	Zeta function, Caceres 6	Proposition	Invalidated(4)
404	Zeta function, properties	Axioms	Invalidated(7)
405	Roman Catholic Church (RCC) Canon law	Theorem	Invalidated(4)
406	Erasmus contra Luther	Controversy	Validated(1)
407	Infallibility and the Historic Church	Pius IX	Invalidated(2)
408	Invalid epiclesis with silent Holy Ghost	Canons	Invalidated(4) Validated(1)

No.	Name of artifact	Type of artifact	Results with instances
409	Magisterium	Paul VI	Invalidated(1)
410	Primacy of the Roman See	Pius XI	Invalidated(1)
411	Sacred heart of Jesus	Pius XI	Invalidated(3)
412	Tradition above scripture	Pius IX	Invalidated(4)
413	Twelfth promise of St Alacoque	Vision	Invalidated(3)
414	Rosser's theorem on consistency	Theorem	Invalidated(6) Validated(1)
415	Rota lattice theory, distributive	Axiom	Invalidated(1)
416	Russell	Paradox	Invalidated(4)
417	S5II+ propositional quantification	System	Invalidated(1)
418	Sabotage modal logic (revisited)	System	Invalidated(6)
419	Sacchetti's modal logics of provability	Definition	Invalidated(1)
420	Sahlqvist modal / quantified correspondence	Theory	Invalidated(7)
421	Sahlqvist non formulas as tautologous	Theory	Invalidated(1)
422	Schaeffer for graphs, P, NP, NPC, NPH, NPI	Theorem	Invalidated(10)
423	Schematic refutations of formula schemata	Method	Invalidated(2)
424	Schrödinger's cat	Paradox	Invalidated(2)
425	Scott's topology, temporal types, landscapes	Theory	Invalidated(4)
426	Self-equilibrium	Law / Paradox	Invalidated(1)
427	Shevenyonov extension nary antropic to PL	System	Invalidated(16) Validated(2)
428	Simulation argument and incompleteness	Conjecture	Invalidated(1)
429	Skolem form	Axiom	Invalidated(1)
430	Sliding scale in law	Theorem	Invalidated(3)
431	Solovay arithmetical / semantical completeness	Theorem	Invalidated(10) Validated(2)
432	Sorites	Paradox	Validated(1)
433	Special theory of relativity: Crothers refutation	Confirmation	Invalidated(1) Validated(4)
434	Square (Łukasiewicz) and Cube (Seuren)	Systems	Invalidated(27) Validated(15)
435	Square of Opposition Meth8 Corrected	System	Validated(6)
436	Square of Opposition Modern Revised	System	Invalidated (2)
437	Square of Opposition	Proportions	Invalidated(3)
438	Stable set lattices	Modal operators	Invalidated(2)
439	Stone space type lattice logic model	Theory	Invalidated(2)
440	Stone-Wales rotation transform reversibility	Theorem	Invalidated(2) Validated(1)
441	Strong jump inversion, decided saturated model	Logic	Invalidated(1)
442	Student quiz conjecture	Paradox	Invalidated(1)

No.	Name of artifact	Type of artifact	Results with instances
443	Superposition of states	Principle	Invalidated(6)
444	Supply and demand	Conjecture	Invalidated(6)
445	Surveillance objectives	Subgames	Invalidated(2)
446	Suzko's minimal truth values for universal logic	Problem	Invalidated(3)
447	Symplectic vector space	Theorem	Invalidated(2)
448	Tarski's geometric axioms and betweenness	System	Invalidated(8) Validated(5)
449	Tarski's undefinability of truth	Theorem	Invalidated(2)
450	Tarski–Grothendieck set theory	Axiom	Invalidated(2)
451	Tarski–Grothendieck Metamath ax-groth	Axiom	Invalidated(7)
452	Tarski's planar Euclidean R-geometry	System	Invalidated(8) Validated(2)
453	Theory of logic for glutty, gappy relations	System	Invalidated(16)
454	Three-valued, bivalent logic VL3	System	Validated(10)
455	Time algorithm	Conjecture	Invalidated(3)
456	Time as God	Conjecture	Validated(2)
457	Time as coexisting past, present, future states	Conjecture	Invalidated(3)
458	Time as tense via converse implication (EQT)	Conjecture	Validated(1)
459	Topological manifold transition	Function	Invalidated(1)
460	Topological T_0 -space	Differ modality	Invalidated(3)
461	Totherian sets	Theory	Invalidated (5)
462	Translation invariance of superposition calculus	Property	Invalidated(2)
463	Triangle inequality	Conjecture	Validated(1)
464	Trivial proofs for a troll	Conjectures	Validated(3)
465	Trolley ethical thought experiment	Problem	Invalidated(3)
466	Turing halting problem	Problem	Invalidated(2) Validated(1)
467	Twin paradox	Paradox	Invalidated(2)
468	Two-sided page	Paradox	Invalidated(5) Validated(1)
469	Type theory	Conjecture	Invalidated(2)
470	Ultrapower of universe, projective determinacy	Hypotheses	Invalidated(2)
471	Unanswered logic questions	Conjectures	Invalidated(2) Validated(1)
472	Unfalsifiability	Conjecture	Invalidated(2) Validated(2)
473	Unification of simple symmetrical modal logics	Type	Invalidated(2)
474	Universal finite set	Theorem	Invalidated(2)
475	Universal network	Operator	Invalidated(5)
476	Universal logic VL4	Logic	Validated

No.	Name of artifact	Type of artifact	Results with instances
477	Veblen (corrected)	Axiom	Invalidated(1) Validated(1)
478	Vector conjecture for two points implying a third	Conjecture	Validated(1)
479	Verilog / VHDL hardware logic	Connectives	Invalidated(36)
480	Veronoï regions (with "nonempty sets")	Definition	Invalidated(3)
481	Vickrey auction	Theorem	Invalidated(10) Validated(2)
482	Vietoris space modal operators	Definitions	Invalidated(2)
483	Visibility graph / Kanban cell resuscitation	Algorithm	Invalidated(1) Validated(1)
484	VŁ4 completeness confirmed	Theorem	Validated(8)
485	VŁ4 theorems for S5	Theorems	Invalidated(8)
486	Vongehr's shift rendering QM "natural"	Paradigm	Invalidated(2) Validated(3)
487	W (K4W)	Theorem	Invalidated(1)
488	Wadge order (and on Scott domain)	Theorem	Invalidated(4)
489	Well ordering property	Axiom	Invalidated(1)
490	White's model of creation	System	Invalidated(7) Validated(1)
491	Wittgenstein's ab-notation	System	Invalidated(3)
492	X-homology on manifolds in topology	Axiom	Invalidated(1)
493	Yalcin logic	Axioms	Invalidated(2)
494	Yinyang	System	Invalidated(1) Validated(3)
495	Zadeh first operators on fuzzy logic	System	Invalidated(5)
496	Historical assumptions	Axioms	Invalidated(4) Validated(1)
497	Resolution and symmetry in Z-numbers	Definitions	Invalidated(3)
498	Zarski topology affine varieties, scheme theory	Definitions	Invalidated(3)
499	Zermelo-Fraenkel constructive (CZF)	Axioms	Invalidated(9) Validated(1)
500	Zermelo-Fraenkel (ZF) shortest contra 9 axioms	Axioms	Invalidated(10)
501	ZFC Empty set	Axiom	Invalidated(2)
502	Shortest refutation	Axiom	Invalidated(3)
503	ZFC Extensionality	Axiom	Invalidated(1) Validated(1)
504	ZFC Extensionality (another rendition)	Axiom	Invalidated(1)
505	Other refutations of ZFC axioms (10)	Axioms	Invalidated(10) Validated(1)
506	ZF Law of excluded middle: infinite set	Axiom	Invalidated(2)
507	ZF supremum and infimum	Definitions	Invalidated(3)
508	ZFC ⁰ : schemas of comprehension, replacement	Axioms	Invalidated(2)
509	Zero and three in arithmetic	Theorems	Validated(9)
510	Zero knowledge proof	Theorem	Invalidated(1)

No.	Name of artifact	Type of artifact	Results with instances
511	Zeroth law of thermodynamics	Theorem	Invalidated(3) Validated(2)
512	Rendering quantifiers as modal operators	Appendix	
513	Meth8 on Modus Cesare and Modus Camestros	Appendix	

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