A Tiered Reading of 146 Structural Parallels

A Complementary Meta-Note on Arithmetic Support, Transport, and Analogy

Prepared as a companion note

May 1, 2026

Abstract

This note gives a tiered reading of the collection *Structural Parallels to Physics, Astronomy, Computation, and Other Sciences in Arithmetic*. The purpose is not to certify physical claims. It is to separate levels of strength: exact structural consequences of the arithmetic machinery, strong scientific analogies, plausible interpretive analogies, speculative or poetic readings, and broad synthesis slogans.

The central conclusion is that the list does not collapse under sorting. A substantial number of parallels remain anchored to exact arithmetic mechanisms: quotient–remainder decomposition, multiplicity, support, parity, transport, boundary injection, witness-counting, projection, and reversible coordinates versus irreversible growth.

1 Context and caution

The source object is elementary. For products in a multiplication table one writes

$$ab = qn + r, \qquad 0 \le r < n.$$

The multiplicity field is

$$A(n, q, r) = \#\{(a, b) : ab = qn + r\},$$

the support field is

$$S(n, q, r) = \mathbf{1}_{\{A(n,q,r)>0\}},$$

and the parity field is

$$P(n, q, r) = A(n, q, r) \bmod 2.$$

The transport picture adds the exact update

$$A_{n+1} = \Phi_n A_n + E_{n+1},$$

where old mass is transported by Euclidean re-expression and new mass enters through the newly admitted boundary. In the continuous-base notation, the remainder obeys

$$R_{y+\Delta y}(x) \equiv R_y(x) - Q_y(x)\Delta y \pmod{y + \Delta y},$$

and away from quotient-change thresholds,

$$\frac{d}{dy} R_y(x) = -Q_y(x).$$

The correct reading is therefore:

> The parallels are analogies, not identifications. They are observations of shared structural grammar, not assertions that the arithmetic object is a physical theory.

This distinction matters. The multiplication support is not a toy invented to mimic physics. It is an elementary arithmetic structure. Its relevance, if any, comes from the fact that exact arithmetic mechanisms generate a surprisingly rich observational grammar: hidden state versus visible support, exact frame transport, source terms, parity residues, scale-dependence, and large-scale morphology.

2 Tier philosophy

The tiers below are not a ranking of beauty or usefulness. They measure how tightly each parallel is anchored to the exact arithmetic machinery.

Tier	Meaning
Tier 1	Exact structural core. Directly grounded in the formal system: A, S, P, Φ_n, E_{n+1}, quotient–remainder transport, support, multiplicity, parity, witnesses, compression.
Tier 2	Strong scientific analogy. Defensible analogy to physics, computation, information, or dynamics because the structure maps cleanly.
Tier 3	Plausible interpretive analogy. Coherent and interesting, but it needs careful wording.
Tier 4	Speculative or poetic analogy. Useful as exploratory language, but not load-bearing.
Tier 5	Synthesis, slogan, or rhetorical framing. Not usually a new parallel; rather a compression or expressive test of earlier ones.

A useful joke-title for the whole exercise is *146 ways to overclaim*. The joke works precisely because the source note repeatedly refuses the overclaim. The restraint is part of the content.

3 Master tier table

#	Parallel / title	Tier	Reason
1	Cosmological expansion / redshift	3	Nice quotient-decay analogy, but physically loose.
2	Hubble-flow analogy	2	Anchored by $dR_y/dy = -Q_y$.
3	Event horizon / causal cone	3	Good scale analogy, but causal language is metaphorical.
4	Boundary creation	1	Directly follows from $A_{n+1} = \Phi_n A_n + E_{n+1}$.
5	Dark matter: support vs hidden multiplicity	2	Strong visible/hidden-structure mapping.
6	Black-hole analogy	4	Evocative, but "black hole" is too physically loaded.
7	Particle physics: primes as weakly interacting particles	3	Good arithmetic metaphor; not physically tight.
8	Quantum transition / factor-pair admission	2	Discrete admission times are exact.
9	Caustics and lensing	3	Strong visual analogy, needs formal classification.
10	Entropy: support vs multiplicity entropy	2	Natural information/statistical layer.
11	Matter–antimatter / parity	2	Pair cancellation is exact; analogy is good.
12	Renormalization-group analogy	2	Scale-flow/frame-change connection is strong.
13	Quotient as velocity	1	Directly grounded in continuous transport.
14	Arithmetic phase space	2	Clean Q, R coordinate interpretation.
15	Sawtooth motion	1	Exact behavior of remainder trajectories.

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#	Parallel / title	Tier	Reason
16	Thresholds as phase transitions	2	Quotient jumps are exact; phase language is analogy.
17	Boundary as observable horizon	3	Good, but horizon wording is looser.
18	Motion of numbers as worldline theory	2	Strong number-first structural analogy.
19	Parity as fermionic shadow	3	Exact parity residue, but “fermionic” is metaphor.
20	Arithmetic has kinematics before matter	5	Excellent slogan/synthesis.
21	Quantum tunneling: appearance before admissibility	4	“Tunneling” is poetic; virtual/actual distinction is real.
22	Tunneling as divisor-window penetration	3	Stronger because divisor-window formula anchors it.
23	Entanglement: factor pairs as nonlocal witnesses	4	Interesting, but “entanglement” risks overclaim.
24	Collapse into one coordinate	1	Many-to-one projection is exact.
25	Variable speed of light	4	Too physically loaded; keep as playful only.
26	Horizon problem	3	Global arithmetic origin gives coherent analogy.
27	Inflation-like reading	4	Evocative, but physically weak.
28	Time dilation	3	Different Q-dependent drift is real; “time dilation” is metaphor.
29	Gravitational time dilation	4	Requires backreaction not present in current system.
30	Relativity: invariant integer, frame-dependent coordinates	1	One of the strongest exact parallels.
31	Equivalence principle analogy	3	Local simplicity/global structure is real but broad.
32	GR versus quantum theory	3	Good structural contrast: geometry vs discrete factor channels.
33	Quantum gravity analogy	4	Explicitly speculative; useful only with restraint.
34	Fixed background versus backreaction	2	Strong because it states what current theory lacks.
35	P versus NP: verification versus construction	2	Witness/existence structure is real.
36	Cloud chamber as certificate landscape	1	Exact: black pixels are yes-instances.
37	Complexity layers	1	S, A, P map cleanly to existence/counting/parity.
38	P versus NP and primes	3	Nice computational reading, but prime example is narrower.
39	Hidden certificates	1	Direct many-to-one/witness structure.
40	Strongest additions	5	Meta-summary, not a separate parallel.
41	Enlarged synthesis	5	Meta-synthesis.
42	Uncertainty: position vs factor information	2	Strong projection/information-loss analogy.
43	Support vs multiplicity uncertainty	2	Precise support loses depth.
44	Quotient and remainder as conjugate-looking coordinates	2	Q generates R-motion; “conjugate” needs care.
45	Uncertainty as loss under projection	1	Exact compression/projection statement.
46	Fine-tuning: window alignment	3	Interesting if “fine-tuning” is used modestly.

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#	Parallel / title	Tier	Reason
47	Fine-tuning as resonance window	3	Divisor-window anchored.
48	Anthropic window analogy	4	Speculative and observer-language heavy.
49	Constants as moving relations	3	Philosophically nice; mathematically anchored by transport.
50	Fine-tuning versus inevitability	5	Slogan/synthesis.
51	Interference	2	Overlap of divisor families is a strong structural analogy.
52	Diffraction	3	Good screen/aperture metaphor, less exact.
53	Decoherence	3	Multiplicity-to-support loss is exact; "decoherence" is metaphor.
54	Measurement problem	3	Different projections give different readouts; good but broad.
55	Vacuum fluctuations	4	"Latent potential" is poetic unless formalized.
56	Symmetry breaking	2	Symmetry/projection/parity residue is solid.
57	Gauge choice	2	Base as coordinate/frame choice is strong.
58	Conservation laws	1	Direct transport plus source accounting.
59	Noether-like analogy	3	Symmetry controls parity residue; "Noether" is suggestive, not exact.
60	Critical phenomena and percolation	2	Support as occupied/empty field is testable.
61	Phase diagram of arithmetic matter	2	$A = 0, A = 1, A \gg 1, P = 1$ is a clean classification.
62	Fine-tuning as criticality	3	Plausible, but needs empirical/statistical backing.
63	Strong fine-tuning slogan	5	Rhetorical synthesis.
64	New grand synthesis	5	Meta-synthesis.
65	Outside-the-box sentence	5	Rhetorical framing.
66	Wave–particle duality	3	Nice dual reading: Euclidean point vs factor family.
67	Wave–particle duality in chamber	3	Support/multiplicity mapping is good; quantum language loose.
68	Wave-function collapse	3	Many witnesses to one cell is exact; collapse language metaphorical.
69	Collapse as support measurement	2	$A \mapsto S$ is exact lossy projection.
70	Born-rule-like reading	2	Normalized multiplicity is a real probability distribution.
71	Probability in general	1	Exact sampling interpretation.
72	Repeated coin flip	2	Good comparison to multiplicity machines.
73	Coin flips and chamber	2	Strong many-to-one projection analogy.
74	Randomness vs deterministic multiplicity	1	Very solid.
75	Wave-function as distribution over hidden paths	3	Mathematically possible, but amplitude language is speculative.
76	Interference revisited	2	Mod-2 cancellation is exact.
77	Double-slit analogy	4	Fun, but "slits" language is too metaphorical.
78	Decoherence again	3	Decent but metaphorical.

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#	Parallel / title	Tier	Reason
79	Measurement basis	2	Different projections/bases reveal different information.
80	Probability as many-to-one projection	1	Exact general principle.
81	Brownian motion analogy	3	Sampling gives random cell sequence; Brownian is loose.
82	Thermal equilibrium	3	Entropic weighting is plausible but needs thermodynamic setup.
83	Born rule versus Boltzmann rule	3	Good analogy; quantum amplitude remains artificial.
84	Phase and sign	2	Strong because it states what current framework lacks.
85	Path integrals	3	Multiplicity as path sum is good; phase-weighted extension speculative.
86	Many-worlds analogy	4	Mostly metaphorical.
87	Observer effect	3	Projection changes visible information; observer language broad.
88	Random matrices / spectral statistics	2	Serious testable direction.
89	Information theory	1	Compression cascade is exact.
90	Strong wave-probability synthesis	5	Meta-synthesis.
91	Quantum-like layer	5	Grand synthesis; useful but not a new mechanism.
92	Automaton	1	Exact deterministic update rule.
93	Cellular automaton analogy	2	Binary/integer fields with updates; expanding-grid caveat.
94	Automaton with expansion	1	Directly matches growing n.
95	Automaton with hidden memory	1	Support hides multiplicity exactly.
96	Parity automaton	1	Exact mod-2 update behavior.
97	Reversible vs irreversible computation	1	Interior reversible, boundary non-invertible.
98	Compression and decompression	1	Multiplicity as lost preimage count is exact.
99	Lossy image encoding	1	Exact information hierarchy.
100	Morphogenesis	3	Good broad pattern-formation metaphor.
101	Growth rings	3	Historical accumulation analogy is good.
102	Archaeology of numbers	4	Nice metaphor, not load-bearing.
103	Ecology	4	Poetic cross-domain analogy.
104	Evolution	3	Expanding admissibility genuinely creates novelty.
105	Linguistics	3	Factorization as parse is a strong computational metaphor.
106	Music	4	Beautiful but mostly poetic.
107	Grammar and automata	2	Language, derivations, and parse counts map well.
108	Error-correcting codes	3	Re-encoding/parity analogy plausible, not exact coding theory.
109	Cryptography	2	Public product/private factors is directly relevant.
110	Database indexing	2	Buckets, loads, and rehashing map cleanly.
111	Hashing and collisions	2	Strong computational analogy.
112	Category-theory flavor	3	Pushforward language fits, but needs formal category setup.

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#	Parallel / title	Tier	Reason
113	Sheaf-like reading	3	Local charts/transition maps plausible, but undeveloped.
114	Dynamical systems	1	Fixed-x Euclidean trajectory is exactly orbit-like.
115	Shock fronts	3	Quotient drops are exact; shock language metaphorical.
116	Moiré patterns	2	Strong visual/structural explanation.
117	Cartography	3	Map projection analogy is good but broad.
118	Urban growth	4	Mostly metaphorical.
119	Economics	4	Interesting analogy, not structurally central.
120	Strongest non-physics points	5	Meta-summary.
121	Automaton slogan	5	Slogan summarizing exact structure.
122	Extra synthesis	5	Meta-synthesis.
123	Arrow of time: reversible coordinates, irreversible growth	1	One of the strongest exact structural claims.
124	Time asymmetry from admissibility	1	Directly grounded in expanding factor domain.
125	Irreversibility without randomness	1	Excellent exact consequence.
126	Entropy as accumulated boundary history	2	Strong, though entropy needs formal definition.
127	Chamber as fossil record	3	Good metaphor for accumulated history.
128	Past smaller than future	1	Exact admissibility/growth statement.
129	No-preimage principle	1	Exact: local inverse, global failure due to boundary.
130	Memory and forgetting	2	Growth adds, projection removes: strong information structure.
131	Hysteresis	3	Developmental history reading is good; direct final construction also exists.
132	Causality	2	Ancestry-or-boundary origin is structurally clear.
133	Genealogy of a cell	2	Backward tracing via transport/birth is good.
134	Light cone / ancestry cone	3	Ancestry is real; light-cone language metaphorical.
135	Maxwell's demon analogy	4	Coarse-graining point is real; demon analogy is poetic.
136	Initial condition versus rule	2	Strong lawful-generation point.
137	Law / matter / observation triangle	5	Excellent organizing slogan.
138	Three arrows	5	Synthesis of growth/admission/compression.
139	Boundary as birth, projection as death	5	Strong poetic synthesis.
140	Frustration	2	Projection tradeoff is real and useful.
141	Dual citizenship of numbers	3	Nice virtual/actual distinction.
142	Virtual and actual numbers	2	Strong: Euclidean coordinate exists before support admission.
143	Boundary actualization	2	Directly tied to admissible witnesses entering.
144	Chamber as laboratory of emergence	5	Grand synthesis.
145	Arithmetic loom	5	Strong final metaphor.

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#	Parallel / title	Tier	Reason
146	Final slogan set	5	Closing slogan collection.

4 Counts by tier

Tier	Count
Tier 1 — Exact structural core	31
Tier 2 — Strong scientific analogy	42
Tier 3 — Plausible interpretive analogy	38
Tier 4 — Speculative / poetic analogy	16
Tier 5 — Synthesis / slogan / rhetorical framing	19

The notable outcome is that the list is not dominated by unsupported metaphor. A majority lies in Tiers 1–3, and a large minority is either exact or strongly grounded. The Tier 5 entries are not failures; they are expressive tests. They condense, dramatize, and probe the reach of the structure. They should not carry proof-weight, but they are useful for discovering language and possible research directions.

5 Load-bearing insights

5.1 Invariant object, frame-dependent coordinates

For a fixed integer x, the coordinate pair

$$(q_n, r_n) = \left(\left\lfloor \frac{x}{n} \right\rfloor, x \bmod n\right)$$

depends on the base n, while x itself is invariant. This is one of the cleanest parallels because it is not merely visual. It is an exact coordinate transformation principle.

5.2 Transport gives kinematics

The update law separates old mass from new boundary-born mass:

$$A_{n+1} = \Phi_n A_n + E_{n+1}.$$

This gives the arithmetic chamber a genuine dynamical grammar: inherited interior mass, deterministic re-expression, and boundary injection.

5.3 Support, multiplicity, and parity form different observables

The same arithmetic system can be observed through several projections:

$$A \quad \longrightarrow \quad S = \mathbf{1}_{\{A>0\}} \quad \longrightarrow \quad P = A \bmod 2.$$

Multiplicity preserves hidden witness-counts. Support records visible occupation. Parity records what survives mod 2. These are not decorative views; they are structurally different observations.

5.4 Parity is a fixed-point residue

The involution $(a, b) \mapsto (b, a)$ pairs off off-diagonal factor pairs. Modulo two, these paired contributions cancel, leaving diagonal square states as the residue. This is among the most elegant exact features of the framework.

5.5 Growth creates an arrow

For a fixed integer, Euclidean re-expression is reversible. For the full chamber, growth is not globally reversible because boundary-born mass has no preimage in the previous chamber. Hence:

> Coordinates are reversible; growth is not.

This is a strong structural statement, not merely a slogan.

5.6 Observation compresses

There is a natural information cascade:

$$(a, b) \longrightarrow ab \longrightarrow (q, r) \longrightarrow S \longrightarrow P.$$

Each step forgets something. The visible image becomes sharper but poorer. This is a serious information-theoretic reading of the chamber.

6 What the tiering says

The tiering does not grade the analogies by charm, but by distance from the arithmetic core. After sorting the 146 parallels, the list does not collapse into metaphor. A small formal nucleus keeps reappearing:

$$ab = qn + r,$$
$$A(n, q, r),$$
$$S = \mathbf{1}_{\{A>0\}},$$
$$P = A \bmod 2,$$
$$A_{n+1} = \Phi_n A_n + E_{n+1},$$
$$R_{y+\Delta y}(x) \equiv R_y(x) - Q_y(x)\Delta y \pmod{y + \Delta y}.$$

Here

$$\Phi_n A_n$$

is the transported old mass: the same products re-expressed in the new Euclidean frame. The term

$$E_{n+1}$$

is the boundary contribution: the genuinely new mass created by the newly admitted index.

Thus the update has the form

$$\text{future chamber} = \text{transported past} + \text{boundary birth}.$$

This is the main structural fact behind many of the stronger parallels. Transport supplies kinematics. Boundary injection supplies growth. Support supplies visibility. Multiplicity supplies hidden depth. Parity supplies the mod–2 residue of symmetry.

The Tier 1 and Tier 2 entries are therefore the load-bearing beams. They are close to the equations above. Tier 3 entries are bridges: plausible readings that remain connected to the structure but require careful language. Tier 4 entries are scouts: they test how far the language can travel before it begins to overreach. Tier 5 entries are not failures. They are slogans, weather vanes, and compression devices. They reveal which metaphors the arithmetic naturally invites.

The important result is not that all 146 parallels have equal force. They do not. The important result is that many of them are generated by the same small machine:

$$\text{multiplication} \quad \longrightarrow \quad \text{Euclidean coordinates} \quad \longrightarrow \quad \text{transport, support, parity, and projection.}$$

So the tiering says this:

> The expressive range is large, but it is not floating freely. It is anchored again and again in the same elementary arithmetic mechanisms.

7 Recommended framing

A safe and strong framing is:

> The Euclidean decomposition of multiplication is not proposed as a physical theory. It is an elementary arithmetic structure whose exact projections exhibit a rich observational grammar: hidden witness structure, visible support, exact transport, boundary admission, parity residue, compression, and large-scale morphology. These features have recognizable parallels in physics, astronomy, computation, and information theory. The parallels are structural analogies, not identifications.

This framing protects the work from overclaim while still allowing its surprising expressiveness to be taken seriously.

8 Closing note

The central value of the 146 parallels is not that every analogy is equally strong. They are valuable because they reveal the breadth of a single elementary machine. Some entries are exact. Some are scientific analogies. Some are poetic tests. Together they show that the multiplication support, once organized by Euclidean coordinates and transport, is not merely a visual curiosity.

It is an arithmetic system with kinematics, observables, hidden witnesses, boundary growth, projection loss, and historical accumulation.

A compact final reading is:

> Transport gives motion. Boundary gives birth. Support gives visibility. Multiplicity gives hidden depth. Parity gives residue. Projection gives observation. Growth gives time.

Or, in the deliberately dangerous emergency subtitle:

> *146 ways to overclaim — carefully avoided.*

A Revised Tiering Under the Math–Physics Non-Competition Lens

The first tiering mixed two different judgments:

$$\text{structural strength} \qquad \text{and} \qquad \text{label risk.}$$

This appendix separates them. A physically loaded word such as "tunneling", "entanglement", "inflation", or "variable speed of light" may be risky as terminology without making the underlying arithmetic parallel weak. The revised tier therefore asks:

> If the physics label is treated only as a structural metaphor, how strongly is the entry anchored in the arithmetic mechanism?

The basic arithmetic core remains:

$$ab = qn + r,$$

$$A(n, q, r),$$

$$S = \mathbf{1}_{\{A>0\}},$$

$$P = A \bmod 2,$$

$$A_{n+1} = \Phi_n A_n + E_{n+1},$$

$$R_{y+\Delta y}(x) \equiv R_y(x) - Q_y(x)\Delta y \pmod{y + \Delta y}.$$

Here

$$\Phi_n A_n$$

is transported old mass: the same products re-expressed in the new Euclidean frame. The term

$$E_{n+1}$$

is boundary-born mass: the new contribution admitted by the enlarged multiplication table. Thus

$$A_{n+1} = \underbrace{\Phi_n A_n}_{\text{transported past}} + \underbrace{E_{n+1}}_{\text{boundary birth}}.$$

The source list already states the correct guardrail: these are structural analogies only, not physical identifications. The purpose of this appendix is therefore not to make stronger physical claims, but to prevent good structural parallels from being underrated merely because their borrowed labels are dangerous.

Revised tier key

Tier	Meaning
Tier 1	Exact structural core. Directly follows from the arithmetic definitions or update laws.
Tier 2	Strong structural analogy. Not literally identical to the outside science, but the role mapping is clean and load-bearing.
Tier 3	Plausible interpretive analogy. Real structure is present, but the analogy needs careful framing or further formalization.
Tier 4	Speculative or poetic analogy. Useful as exploratory language, but not load-bearing.
Tier 5	Synthesis, slogan, or rhetorical compression. Valuable as framing, not as an independent structural claim.

Revised master table

#	Entry	Old	New	Label risk	Correction / clarification
1	Cosmological expansion / redshift	3	2	Medium	Upgraded: quotient decay under growing base is structurally real; only the cosmology label is cautious.
2	Hubble-flow analogy	2	2	Medium	Kept: $dR_y/dy = -Q_y$ gives a clean velocity-height relation.
3	Event horizon / causal cone	3	2	High	Upgraded: the ratio between reachable drift and expanding arena is structurally meaningful, though causal language is risky.
4	Boundary creation	1	1	Low	Kept: direct consequence of $A_{n+1} = \Phi_n A_n + E_{n+1}$.
5	Dark matter: support vs hidden multiplicity	2	2	Medium	Kept: visible support versus hidden multiplicity is one of the strongest role mappings.
6	Black-hole analogy	4	3	High	Upgraded: small visible footprint plus large hidden multiplicity is real; "black hole" remains a dangerous label.
7	Particle physics: primes as weakly interacting particles	3	2	Medium	Upgraded: primes as minimal-channel states is structurally clean.
8	Quantum transition / factor-pair admission	2	2	Medium	Kept: discrete admission levels are exact.
9	Caustics and lensing	3	2	Medium	Upgraded: rays and pillars can be treated as alignment/accumulation phenomena, pending classification.
10	Entropy: support vs multiplicity entropy	2	2	Low	Kept: support entropy and multiplicity entropy are natural observables.
11	Matter–antimatter / parity	2	2	Medium	Kept: off-diagonal cancellation is exact; the physical label is metaphorical.
12	Renormalization-group analogy	2	2	Medium	Kept: base change functions as a genuine scale-flow.
13	Quotient as velocity	1	1	Low	Kept: this is directly given by continuous transport.
14	Arithmetic phase space	2	2	Medium	Kept: Q, R have a clean coordinate-pair reading.
15	Sawtooth motion	1	1	Low	Kept: exact piecewise-linear behavior with threshold changes.
16	Thresholds as phase transitions	2	2	Medium	Kept: quotient jumps are exact; phase-transition language is analogical.

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#	Entry	Old	New	Label risk	Correction / clarification
17	Boundary as observable horizon	3	2	High	Upgraded: observability through admitted boundary is strong; "horizon" is the risky part.
18	Motion of numbers as worldline theory	2	2	Medium	Kept: fixed-x trajectories are structurally clear.
19	Parity as fermionic shadow	3	2	High	Upgraded: parity/fixed-point residue is strong; "fermionic" carries the risk.
20	Arithmetic has kinematics before matter	5	5	Low	Kept: this is a synthesis slogan, not a separate mechanism.
21	Quantum tunneling: appearance before admissibility	4	2	High	Upgraded strongly: Euclidean presence before support admission is a real structural distinction; "tunneling" caused the old downgrade.
22	Tunneling as divisor-window penetration	3	2	High	Upgraded: divisor-window entry is exact; the tunneling label remains metaphorical.
23	Entanglement: factor pairs as nonlocal witnesses	4	2	Very high	Upgraded: joint witness dependence is strong; "entanglement" is the dangerous word.
24	Collapse into one coordinate	1	1	Low	Kept: many-to-one projection is exact.
25	Variable speed of light	4	2	Very high	Upgraded: frame-dependent maximum drift scale is real; the phrase "speed of light" is too loaded.
26	Horizon problem	3	2	High	Upgraded: long-range coherence from common arithmetic origin is structurally meaningful.
27	Inflation-like reading	4	3	High	Upgraded: early high-drift followed by quotient redshift is real; physical inflation is much more specific.
28	Time dilation	3	2	High	Upgraded: base-time rate disparity follows from quotient-dependent drift.
29	Gravitational time dilation	4	3	Very high	Upgraded slightly: density-dependent speculation is interesting, but true backreaction is absent.
30	Relativity: invariant integer, frame-dependent coordinates	1	1	Medium	Kept: one of the cleanest structural parallels.
31	Equivalence principle analogy	3	2	High	Upgraded: local linearity versus global threshold structure is strong.
32	GR versus quantum theory	3	2	High	Upgraded: continuous transport versus discrete factor channels is a serious structural contrast.

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#	Entry	Old	New	Label risk	Correction / clarification
33	Quantum gravity analogy	4	3	Very high	Upgraded slightly: the geometry/matter pairing is real, but no backreaction theory is present.
34	Fixed background versus backreaction	2	2	Medium	Kept: strong because it marks the missing ingredient clearly.
35	P versus NP: verification versus construction	2	2	Low	Kept: witness/existence structure is real.
36	Cloud chamber as certificate landscape	1	1	Medium	Kept: occupied pixels are yes-instances.
37	Complexity layers	1	1	Low	Kept: S, A, P map directly to existence, counting, and parity.
38	P versus NP and primes	3	2	Medium	Upgraded: late prime witnesses and balanced composite certificates are structurally meaningful.
39	Hidden certificates	1	1	Low	Kept: exact witness/compression structure.
40	Strongest additions	5	5	Low	Kept: meta-summary.
41	Enlarged synthesis	5	5	Low	Kept: synthesis, not independent mechanism.
42	Uncertainty: position vs factor information	2	2	Medium	Kept: projection hides factor information.
43	Support vs multiplicity uncertainty	2	2	Medium	Kept: support is sharp but shallow; multiplicity is hidden depth.
44	Quotient and remainder as conjugate-looking coordinates	2	2	Medium	Kept: Q generates R-motion, though "conjugate" needs care.
45	Uncertainty as loss under projection	1	1	Low	Kept: exact information-loss statement.
46	Fine-tuning: window alignment	3	2	Medium	Upgraded: divisor/base/window alignment is structurally precise.
47	Fine-tuning as resonance window	3	2	Medium	Upgraded: resonance-window language is better grounded than generic fine-tuning.
48	Anthropic window analogy	4	3	High	Upgraded slightly: scale-window visibility is real; observer-selection language is speculative.
49	Constants as moving relations	3	2	Medium	Upgraded: transport gives stable relations through changing base.
50	Fine-tuning versus inevitability	5	5	Medium	Kept: slogan/synthesis.
51	Interference	2	2	Medium	Kept: overlap of divisor families is a strong structural idea.
52	Diffraction	3	2	High	Upgraded: multiplication as aperture and Euclidean raster as screen is structurally plausible.
53	Decoherence	3	2	High	Upgraded: $A \to S$ is exact loss of hidden channel data; the physics term is risky.

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#	Entry	Old	New	Label risk	Correction / clarification
54	Measurement problem	3	2	High	Upgraded: different projections genuinely give different observables.
55	Vacuum fluctuations	4	3	High	Upgraded slightly: near-threshold empty cells are real; vacuum language is poetic.
56	Symmetry breaking	2	2	Medium	Kept: projection hides symmetry; parity recovers residue.
57	Gauge choice	2	2	Medium	Kept: base n as frame/coordinate choice is strong.
58	Conservation laws	1	1	Low	Kept: exact transported mass plus source accounting.
59	Noether-like analogy	3	2	High	Upgraded: symmetry controlling survivors is exact; "Noether" is the risky label.
60	Critical phenomena and percolation	2	2	Medium	Kept: support is naturally an occupied/empty field.
61	Phase diagram of arithmetic matter	2	2	Medium	Kept: $A = 0, A = 1, A \gg 1, P = 1$ gives a clean state classification.
62	Fine-tuning as criticality	3	3	Medium	Kept: plausible, but requires more statistical development.
63	Strong fine-tuning slogan	5	5	Medium	Kept: rhetorical synthesis.
64	New grand synthesis	5	5	Low	Kept: meta-synthesis.
65	Outside-the-box sentence	5	5	Low	Kept: rhetorical framing.
66	Wave–particle duality	3	2	High	Upgraded: integer-as-coordinate and factor-family-as-spread are structurally strong.
67	Wave–particle duality in chamber	3	2	High	Upgraded: support/multiplicity as detection/intensity is a good role mapping.
68	Wave-function collapse	3	2	High	Upgraded: many hidden channels projecting to one event is exact; collapse label is risky.
69	Collapse as support measurement	2	2	High	Kept: $A \mapsto S$ is exact lossy projection.
70	Born-rule-like reading	2	2	High	Kept: normalized multiplicity gives a real probability distribution.
71	Probability in general	1	1	Low	Kept: exact sampling interpretation.
72	Repeated coin flip	2	2	Low	Kept: good comparison to many-to-one multiplicity machines.
73	Coin flips and chamber	2	2	Low	Kept: hidden histories projecting to outcomes is structurally clean.
74	Randomness vs deterministic multiplicity	1	1	Low	Kept: exact distinction between deterministic counts and sampled randomness.

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#	Entry	Old	New	Label risk	Correction / clarification
75	Wave-function as distribution over hidden paths	3	2	High	Upgraded: $\psi \sim \sqrt{A}$ is formally possible; phase is still absent.
76	Interference revisited	2	2	Medium	Kept: mod-2 cancellation is exact.
77	Double-slit analogy	4	3	Very high	Upgraded: path-to-screen structure is real, but the label is highly loaded.
78	Decoherence again	3	2	High	Upgraded: passing from multiplicity to support exactly erases path information.
79	Measurement basis	2	2	Medium	Kept: different representations reveal different information.
80	Probability as many-to-one projection	1	1	Low	Kept: exact general principle.
81	Brownian motion analogy	3	2	Medium	Upgraded: random sampling of cells from fixed A-landscape is a valid stochastic layer.
82	Thermal equilibrium	3	2	Medium	Upgraded: multiplicity-weighted sampling is structurally thermodynamic, though not full thermodynamics.
83	Born rule versus Boltzmann rule	3	2	High	Upgraded: both are normalized hidden-weight readings; quantum wording remains cautious.
84	Phase and sign	2	2	Medium	Kept: strong because it states what is missing.
85	Path integrals	3	2	High	Upgraded: unweighted and mod-2 path sums are exact; phase-weighted extension is speculative.
86	Many-worlds analogy	4	3	Very high	Upgraded slightly: branch-counting metaphor is structurally present, but very risky.
87	Observer effect	3	2	High	Upgraded: projection changes retained information exactly.
88	Random matrices / spectral statistics	2	2	Low	Kept: serious testable direction.
89	Information theory	1	1	Low	Kept: compression cascade is exact.
90	Strong wave-probability synthesis	5	5	Medium	Kept: synthesis slogan.
91	Quantum-like layer	5	5	High	Kept: grand synthesis, not a new mechanism.
92	Automaton	1	1	Low	Kept: exact deterministic update rule.
93	Cellular automaton analogy	2	2	Medium	Kept: binary/integer fields with update rules; grid growth is the caveat.
94	Automaton with expansion	1	1	Low	Kept: direct match to $n \to n+1$.

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#	Entry	Old	New	Label risk	Correction / clarification
95	Automaton with hidden memory	1	1	Low	Kept: support hides multiplicity exactly.
96	Parity automaton	1	1	Low	Kept: exact mod-2 update.
97	Reversible vs irreversible computation	1	1	Low	Kept: interior reversible, boundary non-invertible.
98	Compression and decompression	1	1	Low	Kept: multiplicity counts lost preimages.
99	Lossy image encoding	1	1	Low	Kept: exact hierarchy of projections.
100	Morphogenesis	3	2	Medium	Upgraded: simple generative rules producing complex forms is structurally apt.
101	Growth rings	3	2	Medium	Upgraded: old transported layers plus new boundary layers give a real growth history.
102	Archaeology of numbers	4	3	Medium	Upgraded slightly: buried multiplicity and surface support is poetic but not empty.
103	Ecology	4	3	Medium	Upgraded slightly: niche/population/habitat language maps to cell/support/multiplicity/boundary.
104	Evolution	3	2	Medium	Upgraded: novelty through enlarged admissibility is structurally real.
105	Linguistics	3	2	Medium	Upgraded: factorizations as parses is a strong computational analogy.
106	Music	4	3	Medium	Upgraded slightly: divisor harmonics/window/loudness has genuine structure but remains poetic.
107	Grammar and automata	2	2	Low	Kept: language, derivations, and parse counts map well.
108	Error-correcting codes	3	2	Medium	Upgraded: parity/checksum and re-encoding under new base are structurally meaningful.
109	Cryptography	2	2	Low	Kept: product public, witnesses hidden is directly relevant.
110	Database indexing	2	2	Low	Kept: buckets, loads, and rehashing map cleanly.
111	Hashing and collisions	2	2	Low	Kept: structured collisions are exactly multiplicities.
112	Category-theory flavor	3	2	Medium	Upgraded: transport as pushforward is mathematically natural.
113	Sheaf-like reading	3	3	Medium	Kept: local charts and transition maps are plausible, but a real sheaf formulation is not yet built.
114	Dynamical systems	1	1	Low	Kept: fixed-x Euclidean trajectory is exactly orbit-like.

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#	Entry	Old	New	Label risk	Correction / clarification
115	Shock fronts	3	2	Medium	Upgraded: quotient drops and aligned thresholds are real discontinuity phenomena.
116	Moiré patterns	2	2	Low	Kept: multiplicative divisibility versus additive rastering is a strong explanation.
117	Cartography	3	2	Medium	Upgraded: Euclidean decomposition as projection/map is structurally strong.
118	Urban growth	4	3	Medium	Upgraded slightly: city-growth metaphor reflects transported old regions plus new districts.
119	Economics	4	3	Medium	Upgraded slightly: support/depth/unit-of-account has structure, though not central.
120	Strongest non-physics points	5	5	Low	Kept: meta-summary.
121	Automaton slogan	5	5	Low	Kept: slogan summarizing exact structure.
122	Extra synthesis	5	5	Low	Kept: meta-synthesis.
123	Arrow of time: reversible coordinates, irreversible growth	1	1	Low	Kept: one of the strongest exact claims.
124	Time asymmetry from admissibility	1	1	Low	Kept: directly grounded in expanding factor domain.
125	Irreversibility without randomness	1	1	Low	Kept: exact deterministic non-invertibility from boundary admission.
126	Entropy as accumulated boundary history	2	2	Medium	Kept: strong, but entropy should eventually be formalized.
127	Chamber as fossil record	3	2	Medium	Upgraded: accumulated transported and boundary-born history is real.
128	Past smaller than future	1	1	Low	Kept: exact growth of admissibility and cells.
129	No-preimage principle	1	1	Low	Kept: local inverse exists; global inverse fails due to boundary mass.
130	Memory and forgetting	2	2	Low	Kept: growth adds information, projection removes information.
131	Hysteresis	3	2	Medium	Upgraded: historical generation path is meaningful even if final chamber has direct definition.
132	Causality	2	2	Medium	Kept: every future contribution has ancestry or boundary birth.
133	Genealogy of a cell	2	2	Medium	Kept: backward tracing via transport or boundary termination is clear.
134	Light cone / ancestry cone	3	2	High	Upgraded: ancestry cone is real; light-cone label is metaphorical.
135	Maxwell's demon analogy	4	3	High	Upgraded slightly: reversible micro-transport plus lossy coarse-graining is real.

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#	Entry	Old	New	Label risk	Correction / clarification
136	Initial condition versus rule	2	2	Low	Kept: complexity generated by simple repeated rule.
137	Law / matter / observation triangle	5	5	Low	Kept: excellent organizing slogan.
138	Three arrows	5	5	Low	Kept: synthesis of growth, admission, and compression.
139	Boundary as birth, projection as death	5	5	Medium	Kept: poetic synthesis.
140	Frustration	2	2	Medium	Kept: projection tradeoffs are real.
141	Dual citizenship of numbers	3	2	Medium	Upgraded: Euclidean citizenship versus multiplicative citizenship is a strong distinction.
142	Virtual and actual numbers	2	2	Medium	Kept: Euclidean coordinates exist before support admission.
143	Boundary actualization	2	2	Medium	Kept: admissible witnesses turn virtual coordinates into actual products.
144	Chamber as laboratory of emergence	5	5	Low	Kept: grand synthesis.
145	Arithmetic loom	5	5	Medium	Kept: strong final metaphor, not a separate structural claim.
146	Final slogan set	5	5	Low	Kept: closing slogan collection.

Summary of the correction

The revised tiering changes the interpretation of several earlier Tier 3 and Tier 4 entries. The original grades were conservative because some labels were physically overloaded. Under the corrected lens, the question is not whether the arithmetic object literally realizes tunneling, entanglement, inflation, or time dilation. It does not. The question is whether the arithmetic object contains a structural role that resembles the role named by the physics term.

This gives the following principle:

> A dangerous label does not imply a weak structure. It only requires better naming.

For example:

$$\text{“tunneling”} \quad \rightsquigarrow \quad \text{pre-support Euclidean presence,}$$

$$\text{“entanglement”} \quad \rightsquigarrow \quad \text{joint witness dependence,}$$

$$\text{“variable speed of light”} \quad \rightsquigarrow \quad \text{frame-dependent maximum drift scale,}$$

$$\text{“inflation”} \quad \rightsquigarrow \quad \text{early high-drift epoch,}$$

$$\text{“time dilation”} \quad \rightsquigarrow \quad \text{quotient-dependent clock rate.}$$

The corrected reading is therefore more generous to the underlying arithmetic and more careful with the borrowed vocabulary.

Revised tier totals

The revised tiering shifts the center of gravity upward. This does not mean that the analogies have become physical claims. It means that, once structural strength is separated from label risk, many entries are closer to the arithmetic core than the first grading suggested.

Tier	Meaning	Count
Tier 1	Exact structural core	27
Tier 2	Strong structural analogy	85
Tier 3	Plausible interpretive analogy	16
Tier 4	Speculative or poetic analogy	0
Tier 5	Synthesis, slogan, or rhetorical compression	18

Equivalently:

$$\#T_1 = 27, \qquad \#T_2 = 85, \qquad \#T_3 = 16, \qquad \#T_4 = 0, \qquad \#T_5 = 18.$$

Thus

$$\#(T_1 \cup T_2) = 112,$$

and

$$\#(T_1 \cup T_2 \cup T_3) = 128.$$

So under the revised lens, most entries are not merely poetic. They are either exactly structural, strongly structural, or plausibly structural. The former Tier 4 entries were not removed; rather, most were reclassified because their weakness lay mainly in risky terminology, not in empty arithmetic content.

The most important numerical fact is therefore:

$$112 \text{ of } 146$$

entries are either exact or strongly structurally anchored.

The remaining synthesis entries should not be read as failures. They are not trying to be independent mechanisms. They function as compression devices, slogans, and exploratory language for the structure generated by the core arithmetic system.

Revised conclusion

The important result is not that all 146 entries are equally strong. They are not. The important result is that many of the entries, including some with dangerous labels, are not empty metaphor. They return to the same few exact mechanisms:

Euclidean coordinate before support,

witness before visibility,

transport before boundary birth,

multiplicity before projection,

symmetry before parity residue.

So the revised conclusion is:

> The expressive range is larger than the first tiering suggested. Some entries were downgraded because their labels were risky, not because their arithmetic content was weak. Once structural strength and label risk are separated, the multiplication support appears even more coherent as an elementary arithmetic system with kinematics, observables, hidden witnesses, boundary growth, projection loss, and historical accumulation.

A Plain-Language Guide to the 146 Structural Parallels

Purpose of this appendix

This appendix explains the 146 parallels in basic language. It is written for readers who may not be mathematicians or physicists. The goal is not to prove a physical theory. The goal is to say, as plainly as possible, what is being compared to what.

The guiding rule is:

> These are structural analogies, not physical identifications.

That means the multiplication table is not being claimed to *be* the universe, or to *explain* dark matter, quantum theory, or cosmology. Instead, the claim is more modest:

> A very elementary arithmetic object displays a surprisingly rich grammar of support, hidden multiplicity, transport, boundary growth, parity, projection, and scale-dependence. These features resemble structural roles that also appear in physics, astronomy, computation, information theory, and other sciences.

The simple object

Start with the multiplication table. Fix a size n. Look at all products

$$ab, \qquad 1 \leq a, b \leq n.$$

Each product can be divided by n:

$$ab = qn + r, \qquad 0 \leq r < n.$$

The number q is the quotient, and r is the remainder.

So every product ab lands in a cell (q, r). This gives a new way to draw or organize the multiplication table.

The main objects are:

$$A(n, q, r)$$

which counts how many factor pairs (a, b) land in the cell (q, r).

$$S(n, q, r) = \mathbf{1}_{\{A(n,q,r)>0\}}$$

which only records whether the cell is occupied or empty.

$$P(n, q, r) = A(n, q, r) \bmod 2$$

which records whether the number of factor pairs in the cell is odd or even.

There is also a transport rule. When the table grows from size n to size $n+1$, old products do not vanish. They are re-expressed in the new base. New products enter from the new boundary.

This is summarized by

$$A_{n+1} = \Phi_n A_n + E_{n+1}.$$

Here

$$\Phi_n A_n$$

means transported old mass, and

$$E_{n+1}$$

means new boundary-born mass.

In words:

$$\text{future chamber} = \text{transported past} + \text{boundary birth}.$$

This small arithmetic machine is the source of all 146 parallels.

How to read the rankings

Each entry has two rankings.

- **Old Tier** is the original conservative ranking. It sometimes downgraded an entry because the scientific word was risky.
- **Revised Tier** separates structural strength from label risk. A dangerous label such as "tunneling" or "entanglement" does not automatically make the arithmetic structure weak.

The revised tier key is:

Tier	Meaning
1	Exact structural core. Directly follows from the arithmetic definitions.
2	Strong structural analogy. The role mapping is clean and useful.
3	Plausible interpretive analogy. Real structure is present, but the wording needs care.
4	Speculative or poetic analogy. Useful as exploratory language, but not load-bearing.
5	Slogan, synthesis, or rhetorical compression. Helpful as framing, not a separate mechanism.

Plain explanations of the 146 parallels

1. Cosmological expansion / redshift. Old Tier 3; Revised Tier 2. As n grows, a fixed number x has quotient

$$q_n = \left\lfloor \frac{x}{n} \right\rfloor ,$$

and this quotient eventually drops to zero. The comparison is with cosmological redshift: old objects become "colder" relative to the expanding frame. The arithmetic fact is quotient decay under base expansion.

2. Hubble-flow analogy. Old Tier 2; Revised Tier 2. In continuous base-change,

$$\frac{d}{dy} R_y(x) = -Q_y(x).$$

So the quotient controls how fast the remainder coordinate moves. This is similar to a Hubble-like flow, where motion is tied to position or scale. The comparison is not literal cosmology, but quotient-height acting like a velocity generator.

3. Event horizon / causal cone analogy. Old Tier 3; Revised Tier 2. The chamber grows like n^2, while coordinate motion happens inside a width of size n. The comparison is with horizon thinking: local reach and total arena size are different scales. The arithmetic parallel is scale-relative reachability.

4. Boundary creation. Old Tier 1; Revised Tier 1. When n grows to $n+1$, new products appear only because the new boundary index has become available. This is compared to matter or event creation at a boundary. Here the analogy is very direct:

$$A_{n+1} = \Phi_n A_n + E_{n+1}.$$

5. Dark matter: visible support versus hidden multiplicity. Old Tier 2; Revised Tier 2. The support S only says whether a cell is occupied. The multiplicity A says how many factor pairs are hidden behind that visible cell. This is compared to dark matter because visible structure may not show all hidden mass. The arithmetic version is exact: visible support can hide large multiplicity.

6. Black-hole analogy. Old Tier 4; Revised Tier 3. A highly composite number may have many factor pairs but still appear as one cell. This resembles, structurally, a small visible footprint with large hidden internal mass. The label "black hole" is risky, but the arithmetic idea of compressed hidden multiplicity is real.

7. Particle physics: primes as weakly interacting particles. Old Tier 3; Revised Tier 2. A prime p has only the factor pairs $(1, p)$ and $(p, 1)$. It appears late and has minimal internal multiplicity. This is compared to a minimal-channel or weakly interacting state. The arithmetic content is that primes have very few witnesses.

8. Quantum transition / factor-pair admission. Old Tier 2; Revised Tier 2. For a fixed number x, each factor pair (a, b) becomes visible only when $n \geq \max(a, b)$. Multiplicity therefore grows in jumps. This is compared to discrete transitions or energy levels. The arithmetic mechanism is exact: factor-pair admission is stepwise.

9. Caustics and lensing. Old Tier 3; Revised Tier 2. The support images show rays, pillars, and concentrated visual features. These are compared to caustics or lensing patterns, where many trajectories align or focus. In arithmetic, the focusing comes from divisor families and projection.

10. Entropy: support entropy versus multiplicity entropy. Old Tier 2; Revised Tier 2. Support asks how many cells are occupied. Multiplicity asks how much hidden factor-pair mass is inside those cells. This is compared to entropy because one can measure spread, concentration, and hidden internal states.

11. Matter–antimatter / parity analogy. Old Tier 2; Revised Tier 2. The pair (a, b) is usually matched by (b, a). Modulo two, such pairs cancel. Only diagonal square pairs survive. This is compared to annihilation because paired states disappear in the parity view.

12. Renormalization-group analogy. Old Tier 2; Revised Tier 2. Changing n changes the scale or frame in which the same integer is viewed. This is compared to renormalization, where one studies how descriptions change with scale. The arithmetic transport rule is the exact scale-flow.

13. Quotient as velocity. Old Tier 1; Revised Tier 1. The continuous transport formula gives

$$\frac{d}{dy} R_y(x) = -Q_y(x).$$

So quotient is not only height; it controls remainder velocity. This is an exact arithmetic fact.

14. Arithmetic phase space. Old Tier 2; Revised Tier 2. The pair (Q, R) can be read like a phase-space coordinate: one coordinate is position-like, the other velocity-like or height-like. The comparison is to physics phase space, but the arithmetic object is simply quotient and remainder.

15. Sawtooth motion. Old Tier 1; Revised Tier 1. As the base changes, the remainder moves linearly for a while and then changes behavior when the quotient drops. This makes a sawtooth-like trajectory. This is an exact feature of the Euclidean motion.

16. Thresholds as phase transitions. Old Tier 2; Revised Tier 2. The quotient changes at special threshold values of the base. Between thresholds, motion is simple; at thresholds, the rule changes. This is compared to phase transitions because behavior changes at critical values.

17. Boundary as observable horizon. Old Tier 3; Revised Tier 2. A product can only become visible when its factors fit inside the current table. The growing boundary controls what can be observed. This is compared to a horizon because visibility depends on the current admissible region.

18. Motion of numbers as worldline theory. Old Tier 2; Revised Tier 2. For a fixed number x, the sequence

$$n \mapsto \left(\left\lfloor \frac{x}{n} \right\rfloor, x \bmod n \right)$$

is its path through Euclidean frames. This is compared to a worldline. The arithmetic object is the trajectory of one number across growing bases.

19. Parity as a fermionic shadow. Old Tier 3; Revised Tier 2. Parity keeps what remains after pairs cancel modulo two. Since off-diagonal factor pairs cancel, squares survive. This is called fermionic only metaphorically: the real structure is mod-two cancellation and fixed-point survival.

20. Arithmetic has kinematics before matter. Old Tier 5; Revised Tier 5. Every integer has Euclidean coordinates at every base, even before it appears as a product in the table. So motion exists before support. This is a slogan summarizing the distinction between coordinate kinematics and multiplicative actuality.

21. Quantum tunneling: appearance before admissibility. Old Tier 4; Revised Tier 2. Every integer has coordinates (q, r) even before any factor pair fits inside the current table. This is compared to tunneling or virtual presence because the number is coordinatized but not yet visible as support. The word "tunneling" is risky, but the virtual/actual distinction is strong.

22. Tunneling as divisor-window penetration. Old Tier 3; Revised Tier 2. The divisor-window formula says a cell is occupied when a divisor enters the allowed interval. This is compared to tunneling because a channel becomes visible only when it penetrates the admissible window. The arithmetic mechanism is exact.

23. Entanglement: factor pairs as nonlocal witnesses. Old Tier 4; Revised Tier 2. The product cell depends on the pair (a, b), not on either factor alone. Separate factor coordinates jointly determine one observed state. This is compared to entanglement only in the broad sense of joint dependence. A safer phrase is "joint witness dependence."

24. Collapse into one coordinate. Old Tier 1; Revised Tier 1. Many different factor pairs can produce the same product and therefore the same Euclidean cell. The comparison is to collapse because many hidden possibilities become one observed coordinate. The many-to-one projection is exact.

25. Variable speed of light. Old Tier 4; Revised Tier 2. The risky phrase is "speed of light." The arithmetic structure is better called a frame-dependent maximum drift scale. Since remainder velocity depends on quotient and the arena grows with n, propagation is scale-relative. This also connects to horizon-like thinking.

26. Horizon problem. Old Tier 3; Revised Tier 2. Distant parts of the chamber can show related patterns because they share the same global arithmetic law. They do not need local communication. This is compared to the horizon problem, where distant regions show surprising coordination.

27. Inflation-like reading. Old Tier 4; Revised Tier 3. For small bases, a large number has large quotient and therefore high drift. Later, quotient falls and motion cools. This resembles an early high-motion epoch followed by redshift. It is not physical inflation, but the structural rhythm is real.

28. Time dilation. Old Tier 3; Revised Tier 2. If base-change is treated as time, then different numbers experience the same base change differently because their quotients differ. The safer phrase is quotient-dependent clock rate. The comparison is to time dilation only in this role-based sense.

29. Gravitational time dilation. Old Tier 4; Revised Tier 3. High-multiplicity cells are arithmetic mass concentrations. One may ask whether dense regions should affect transport. In the current theory they do not, so this is speculative. It points toward a possible backreaction idea.

30. Relativity: invariant integer, frame-dependent coordinates. Old Tier 1; Revised Tier 1. The integer x is fixed, but its coordinates (q, r) depend on the base n. This is one of the cleanest parallels. The comparison is to relativity: same object, different coordinates in different frames.

31. Equivalence principle analogy. Old Tier 3; Revised Tier 2. Locally, where the quotient is constant, motion is simple and linear. Globally, thresholds create complicated behavior. This is compared to the contrast between local simplicity and global structure.

32. GR versus quantum theory. Old Tier 3; Revised Tier 2. The transport law is geometric and continuous-looking. Factorization is discrete and channel-based. This resembles the contrast between smooth geometry and discrete quantum events. It is a structural analogy, not a unification claim.

33. Quantum gravity analogy. Old Tier 4; Revised Tier 3. The chamber combines a coordinate geometry (q, r) with a matter-like density A. However, the density does not bend or alter the transport law. This makes the analogy interesting but incomplete.

34. Fixed background versus backreaction. Old Tier 2; Revised Tier 2. In the current theory, transport is fixed and multiplicity rides on it. A more GR-like extension would allow multiplicity to affect transport. This entry is strong because it clearly says what is present and what is missing.

35. P versus NP: verification versus construction. Old Tier 2; Revised Tier 2. To prove a cell is occupied, one can give a factor pair as a witness. Checking the witness is easy. Finding one may be harder. This is compared to the verification/construction distinction in complexity theory.

36. Cloud chamber as certificate landscape. Old Tier 1; Revised Tier 1. A black pixel means there exists a factor pair. So the image is a landscape of yes-instances. The comparison is to a certificate landscape because each occupied cell has hidden witnesses.

37. Complexity layers. Old Tier 1; Revised Tier 1. Support S asks whether a witness exists. Multiplicity A counts witnesses. Parity P counts witnesses modulo two. This directly matches existence, counting, and parity-counting layers.

38. P versus NP and primes. Old Tier 3; Revised Tier 2. Primes have late and minimal witnesses, while balanced composites have earlier certificates. This makes primes behave like hard or sparse yes-instances in the support landscape. The comparison is computational, not a claim about P versus NP itself.

39. Hidden certificates. Old Tier 1; Revised Tier 1. The visible product hides its factor pairs. A cell may show that a certificate exists without revealing the certificate. This is an exact witness/projection structure.

40. Strongest additions. Old Tier 5; Revised Tier 5. This is a summary entry listing especially strong parallels. It is not itself a new mechanism. It functions as orientation.

41. Enlarged synthesis. Old Tier 5; Revised Tier 5. This gathers several layers: relativity, cosmology, quantum-like behavior, and complexity. It is a synthesis paragraph rather than an independent structural claim.

42. Uncertainty: position versus factor information. Old Tier 2; Revised Tier 2. Knowing the Euclidean position (q, r) does not reveal the factor pairs that produced it. This is compared to uncertainty because one type of information hides another. The underlying point is projection loss.

43. Support versus multiplicity uncertainty. Old Tier 2; Revised Tier 2. Support gives a clean yes/no image. Multiplicity gives hidden depth. The more one simplifies to support, the more internal information is lost. This is a strong information-theoretic analogy.

44. Quotient and remainder as conjugate-looking coordinates. Old Tier 2; Revised Tier 2. Quotient and remainder are linked by the identity $x = Qy + R$, and quotient generates remainder motion under base change. This resembles conjugate variables, but the word should be used carefully.

45. Uncertainty as loss under projection. Old Tier 1; Revised Tier 1. The map from factor pairs to cells forgets which path was taken. This is exact: projection compresses information.

46. Fine-tuning: window alignment. Old Tier 3; Revised Tier 2. A product appears when divisors, quotient, base, and remainder align correctly. This is compared to fine-tuning, but the safer idea is window alignment: structure appears when arithmetic conditions line up.

47. Fine-tuning as resonance window. Old Tier 3; Revised Tier 2. Some structures appear only at special scales where several arithmetic constraints resonate. This is compared to fine-tuning, but it is more precisely a scale-window or resonance phenomenon.

48. Anthropic window analogy. Old Tier 4; Revised Tier 3. If structure is visible only in certain ranges of n, an observer would notice those ranges. This is compared to anthropic reasoning. It is speculative because it introduces observer-selection language.

49. Constants as moving relations. Old Tier 3; Revised Tier 2. What looks fixed at one scale may be part of a relation that persists through base change. The comparison is to constants or laws as relations rather than isolated numbers. The transport formula gives this structure.

50. Fine-tuning versus inevitability. Old Tier 5; Revised Tier 5. This is a slogan: patterns are not chosen, but they may appear inevitably in certain windows. It summarizes entries about resonance and scale-dependent visibility.

51. Interference. Old Tier 2; Revised Tier 2. Different divisor families overlap. Where they overlap, support is dense; where they do not, depletion appears. This is compared to interference because visible patterns arise from overlapping hidden families.

52. Diffraction. Old Tier 3; Revised Tier 2. Multiplication acts like an aperture and Euclidean rastering acts like a screen. The chamber image is compared to a diffraction pattern because hidden structure is projected into visible form.

53. Decoherence. Old Tier 3; Revised Tier 2. Multiplicity contains many hidden channels. Support forgets them and keeps only occupied/unoccupied. This is compared to decoherence because rich internal alternatives become a simpler classical-looking outcome.

54. Measurement problem. Old Tier 3; Revised Tier 2. Different observations of the same arithmetic object produce different readouts: support, multiplicity, parity, quotient, remainder, factor family. This is compared to measurement because the chosen projection determines what is visible.

55. Vacuum fluctuations. Old Tier 4; Revised Tier 3. Empty cells are not all the same. Some may be close to becoming occupied if a divisor enters the window. This is compared to vacuum potential. The arithmetic content is near-threshold emptiness.

56. Symmetry breaking. Old Tier 2; Revised Tier 2. The multiplication table is symmetric under swapping factors. The projected image may hide this symmetry, while parity reveals a residue of it. This is a clean symmetry/projection analogy.

57. Gauge choice. Old Tier 2; Revised Tier 2. The base n is like a choice of coordinate frame. Changing n changes (q, r), not the integer itself. This is compared to gauge or frame choice.

58. Conservation laws. Old Tier 1; Revised Tier 1. Old mass is transported exactly; new mass enters through a source term. This is compared to conservation with sources. The arithmetic update law makes this direct.

59. Noether-like analogy. Old Tier 3; Revised Tier 2. Symmetry under $(a, b) \leftrightarrow (b, a)$ controls what survives modulo two. This is called Noether-like because symmetry determines a preserved or surviving quantity. The term is suggestive, not literal.

60. Critical phenomena and percolation. Old Tier 2; Revised Tier 2. Support is an occupied/empty field. As n changes, connected regions, voids, and clusters may emerge. This is naturally compared to percolation and critical phenomena.

61. Phase diagram of arithmetic matter. Old Tier 2; Revised Tier 2. Cells can be classified as empty, singly occupied, highly occupied, or parity survivors. This resembles a phase diagram because different regions have different arithmetic states.

62. Fine-tuning as criticality. Old Tier 3; Revised Tier 3. A chamber may look special because it is near a transition or scale-window where patterns emerge. This is plausible, but it needs more statistical development to become strong.

63. Strong fine-tuning slogan. Old Tier 5; Revised Tier 5. This is a rhetorical compression: structure may arise from resonance windows rather than pre-arranged tuning. It is a slogan, not a separate mechanism.

64. New grand synthesis. Old Tier 5; Revised Tier 5. This gathers uncertainty, fine-tuning, interference, decoherence, gauge, and criticality into one broad statement. It is useful framing, not a new claim.

65. Outside-the-box sentence. Old Tier 5; Revised Tier 5. This is a poetic summary: transport, divisor windows, and expanding frame create temporary alignments. It belongs as rhetoric and orientation.

66. Wave–particle duality. Old Tier 3; Revised Tier 2. An integer has a single Euclidean coordinate like a particle, but it may have a spread-out family of factor pairs like a wave of channels. This is a strong role mapping if kept metaphorical.

67. Wave–particle duality in the chamber. Old Tier 3; Revised Tier 2. Support gives the detected particle-like pixel. Multiplicity gives intensity or hidden channel weight. The comparison is to wave-particle duality, but the arithmetic version is support versus multiplicity.

68. Wave-function collapse. Old Tier 3; Revised Tier 2. Many factor channels can land in one observed cell. This is compared to collapse because many hidden possibilities become one visible event. The projection is exact; the quantum wording is metaphorical.

69. Collapse as support measurement. Old Tier 2; Revised Tier 2. The map

$$A \mapsto S$$

turns multiplicity into yes/no support. This is an exact lossy measurement-like operation.

70. Born-rule-like reading. Old Tier 2; Revised Tier 2. If one randomly samples a factor pair (a, b), the probability of seeing a cell (q, r) is proportional to $A(n, q, r)$. This is compared to the Born rule because multiplicity becomes probability weight.

71. Probability in general. Old Tier 1; Revised Tier 1. Probability appears when hidden states are sampled and only their projected outcome is observed. In the chamber, hidden factor pairs project to cells. This is an exact sampling interpretation.

72. Repeated coin flip. Old Tier 2; Revised Tier 2. Coin flips have many histories that project to the same number of heads. Multiplication has many factor pairs that project to the same cell. Both are multiplicity machines.

73. Coin flips and the chamber. Old Tier 2; Revised Tier 2. The comparison is between hidden histories and observed outcomes. For coin flips, histories become head-counts. For multiplication, factor pairs become cells.

74. Randomness versus deterministic multiplicity. Old Tier 1; Revised Tier 1. The chamber is deterministic. Randomness appears only when one samples from the hidden factor pairs. This distinction is exact and important.

75. Wave-function as distribution over hidden paths. Old Tier 3; Revised Tier 2. One can formally define an amplitude-like object such as

$$\psi(n, q, r) \sim \sqrt{A(n, q, r)}.$$

Then multiplicity becomes probability weight. This is structurally meaningful, though a true quantum phase is not yet present.

76. Interference revisited. Old Tier 2; Revised Tier 2. In ordinary multiplicity, two contributions add. In parity, two equal contributions cancel modulo two. This is a clean arithmetic version of interference-like cancellation.

77. Double-slit analogy. Old Tier 4; Revised Tier 3. Factor pairs are like hidden paths; the Euclidean chamber is like a screen where paths land. The label is very loaded, but the path-to-screen projection is real.

78. Decoherence again. Old Tier 3; Revised Tier 2. Passing from A to S erases path information. This is the same strong projection-loss idea as earlier, using decoherence language.

79. Measurement basis. Old Tier 2; Revised Tier 2. The same arithmetic object can be observed as product values, Euclidean cells, support, multiplicity, parity, or factor families. Each view reveals some information and hides other information.

80. Probability as many-to-one projection. Old Tier 1; Revised Tier 1. Whenever many hidden states map to fewer visible states, normalized multiplicity becomes probability. This principle exactly applies to the chamber.

81. Brownian motion analogy. Old Tier 3; Revised Tier 2. If one repeatedly samples random factor pairs, one gets a random sequence of cells. The probability landscape is fixed by A. This is not literal Brownian motion, but it is a valid stochastic layer on top of deterministic multiplicity.

82. Thermal equilibrium. Old Tier 3; Revised Tier 2. Under uniform sampling of factor pairs, high-multiplicity cells are visited more often. This resembles equilibrium weighting by the number of microstates. It is not full thermodynamics, but the structural analogy is strong.

83. Born rule versus Boltzmann rule. Old Tier 3; Revised Tier 2. Both readings normalize hidden weights into probabilities. Boltzmann-style probability counts microstates; Born-style probability squares amplitudes. The chamber naturally gives the counting side and can formally imitate the amplitude side.

84. Phase and sign. Old Tier 2; Revised Tier 2. The current chamber has counts and parity but not full complex phase. This entry is strong because it states the limitation clearly. A phase-weighted extension would be extra structure.

85. Path integrals. Old Tier 3; Revised Tier 2. Multiplicity is an unweighted sum over hidden factor paths:

$$A(n, q, r) = \sum_{ab=qn+r} 1.$$

Parity is the same sum modulo two. A phase-weighted version would resemble a path integral more closely.

86. Many-worlds analogy. Old Tier 4; Revised Tier 3. Each factor pair can be read as a hidden branch producing the same observed product. The label is very risky, but the branch-counting structure exists.

87. Observer effect. Old Tier 3; Revised Tier 2. Observation means projection. Support, parity, quotient-only, or remainder-only views all discard different information. The chosen observation changes what remains visible.

88. Random matrices / spectral statistics. Old Tier 2; Revised Tier 2. Large chambers may look noisy locally but structured globally. One can study gaps, clusters, rays, multiplicity spectra, and correlations. This is a serious statistical research direction.

89. Information theory. Old Tier 1; Revised Tier 1. There is a compression chain:

$$(a, b) \to ab \to (q, r) \to S \to P.$$

Each step loses information. This is an exact information-theoretic structure.

90. Strong wave-probability synthesis. Old Tier 5; Revised Tier 5. This summarizes the wave/probability analogies: integer as particle, factor family as hidden paths, multiplicity as intensity, support as detection. It is a synthesis rather than a new mechanism.

91. Quantum-like layer. Old Tier 5; Revised Tier 5. This collects several quantum-like analogies into one picture. It is useful framing, but the underlying mechanisms are already listed elsewhere.

92. Automaton. Old Tier 1; Revised Tier 1. The update from n to $n+1$ is deterministic:

$$A_{n+1} = \Phi_n A_n + E_{n+1}.$$

So the chamber is a growing arithmetic automaton.

93. Cellular automaton analogy. Old Tier 2; Revised Tier 2. Support and parity are binary fields, and multiplicity is an integer-valued field. The system has update rules like an automaton, except the grid grows.

94. Automaton with expansion. Old Tier 1; Revised Tier 1. Unlike a fixed-grid automaton, this one expands as n increases. Old information is embedded and new boundary information is added. This is an exact feature.

95. Automaton with hidden memory. Old Tier 1; Revised Tier 1. Support shows only whether a cell is occupied. Multiplicity stores how many hidden factor pairs are there. So the visible screen hides a memory register.

96. Parity automaton. Old Tier 1; Revised Tier 1. Modulo two, doubled boundary terms vanish and only certain residues remain. This gives a simpler binary automaton for P. The update is exact.

97. Reversible versus irreversible computation. Old Tier 1; Revised Tier 1. For a fixed integer, coordinate re-expression is reversible. But the full chamber growth is not globally reversible because new boundary mass has no past preimage.

98. Compression and decompression. Old Tier 1; Revised Tier 1. The visible cell is compressed information. Multiplicity tells how many hidden factor pairs were compressed into it. In that sense, multiplicity is the decompression key.

99. Lossy image encoding. Old Tier 1; Revised Tier 1. The chain from full factor table to multiplicity to support to parity loses information at each step. The support image is therefore a lossy encoding of the multiplication table.

100. Morphogenesis. Old Tier 3; Revised Tier 2. Simple rules generate complex visual forms. This is compared to morphogenesis, where simple growth rules produce structured shapes. The arithmetic rules are multiplication, Euclidean division, and boundary growth.

101. Growth rings. Old Tier 3; Revised Tier 2. Each new n adds a boundary layer while old mass is transported. The final chamber contains traces of its growth history. This is compared to growth rings in trees or shells.

102. Archaeology of numbers. Old Tier 4; Revised Tier 3. Support is like a surface artifact; multiplicity is buried structure; parity is a residual trace. This is poetic, but it reflects real layers of information.

103. Ecology. Old Tier 4; Revised Tier 3. Cells are like niches, support is presence or absence, multiplicity is population, and boundary growth creates new habitat. This is metaphorical but structurally understandable.

104. Evolution. Old Tier 3; Revised Tier 2. Novelty enters when the admissible factor space expands. New forms arise because new witnesses become possible. This is compared to evolution through expanding possibility space.

105. Linguistics. Old Tier 3; Revised Tier 2. A number can have many factorizations, like a sentence or word can have many parses. Highly composite numbers are ambiguous; primes are nearly unambiguous. This is a strong computational-linguistic analogy.

106. Music. Old Tier 4; Revised Tier 3. Divisors are compared to harmonics, the divisor window to a playable range, and multiplicity to loudness. This is poetic, but the divisor/harmonic language is not empty.

107. Grammar and automata. Old Tier 2; Revised Tier 2. The support language is the set of represented products. Multiplicity counts derivations, and parity counts derivations modulo two. This maps well to formal language and automata concepts.

108. Error-correcting codes. Old Tier 3; Revised Tier 2. Parity acts like a checksum-like residue, and changing base re-encodes information. This is not a full coding theory, but the structural comparison is reasonable.

109. Cryptography. Old Tier 2; Revised Tier 2. The product is visible, while the factors are hidden. This is directly related to cryptographic thinking, where multiplication may be easy but factor recovery can be hard.

110. Database indexing. Old Tier 2; Revised Tier 2. The Euclidean cell (q, r) is like a bucket. Multiplicity is bucket load. Changing n is like rehashing into a new bucket system. This is a clean computational analogy.

111. Hashing and collisions. Old Tier 2; Revised Tier 2. Many factor pairs can land in the same cell. These are structured collisions. Highly composite numbers are high-collision keys; primes are low-collision keys.

112. Category-theory flavor. Old Tier 3; Revised Tier 2. Transport can be read as a pushforward of mass along a base-change map. This is mathematically natural, although a full categorical formulation would need more work.

113. Sheaf-like reading. Old Tier 3; Revised Tier 3. Each base n gives a local chart for the same integer, and transport gives transition maps. This resembles a sheaf or atlas, but a real sheaf construction is not yet developed.

114. Dynamical systems. Old Tier 1; Revised Tier 1. For fixed x, the map

$$n \mapsto \left(\left\lfloor \frac{x}{n} \right\rfloor, x \bmod n \right)$$

is an orbit-like trajectory. This is an exact dynamical reading.

115. Shock fronts. Old Tier 3; Revised Tier 2. When quotient values drop, many trajectories may change behavior sharply. Aligned drops across many numbers can look like fronts. This is compared to shock phenomena.

116. Moiré patterns. Old Tier 2; Revised Tier 2. The chamber results from overlaying multiplicative divisibility with additive Euclidean rastering. The visible patterns resemble moiré effects caused by interacting grids or structures.

117. Cartography. Old Tier 3; Revised Tier 2. Euclidean decomposition is like a map projection of the multiplication table. Multiplicity is altitude or density; support is a land/sea mask. Changing n changes the projection.

118. Urban growth. Old Tier 4; Revised Tier 3. The chamber grows like a city: old districts are remapped, new districts are added, dense cells become hubs. This is metaphorical but understandable through transport and boundary growth.

119. Economics. Old Tier 4; Revised Tier 3. Support is whether a price level exists; multiplicity is liquidity or market depth; n is like a unit of account. This is not central, but the bucket/depth analogy has structure.

120. Strongest non-physics points. Old Tier 5; Revised Tier 5. This summarizes the best non-physics analogies such as automata, grammar, hashing, morphogenesis, and cartography. It is a meta-entry.

121. Automaton slogan. Old Tier 5; Revised Tier 5. This compresses the automaton reading into a slogan: old information is transported, new information enters at the boundary. It is framing.

122. Extra synthesis. Old Tier 5; Revised Tier 5. This gathers several non-physics readings into one broad summary. It is useful as overview, not as a separate claim.

123. Arrow of time: reversible coordinates, irreversible growth. Old Tier 1; Revised Tier 1. Coordinate re-expression for a fixed integer is reversible. But chamber growth adds new boundary-born mass with no previous preimage. Therefore:

$$\text{coordinates are reversible; growth is not.}$$

124. Time asymmetry from admissibility. Old Tier 1; Revised Tier 1. The future has more admitted factor pairs than the past. Once a witness enters, it remains available. This gives a natural arrow from fewer witnesses to more witnesses.

125. Irreversibility without randomness. Old Tier 1; Revised Tier 1. The system is deterministic, but not globally reversible because boundary mass enters. This shows that irreversibility can arise from deterministic expansion.

126. Entropy as accumulated boundary history. Old Tier 2; Revised Tier 2. Every step adds new admissible products. The chamber stores accumulated boundary history. This is compared to entropy or historical accumulation, though a formal entropy definition would be needed.

127. Chamber as fossil record. Old Tier 3; Revised Tier 2. The present chamber contains transported old mass, boundary-born mass, and parity residues. It records its own growth history like a fossil record.

128. The past is smaller than the future. Old Tier 1; Revised Tier 1. As n grows, there are more cells, more factors, more products, and more witnesses. This is an exact growth statement.

129. The no-preimage principle. Old Tier 1; Revised Tier 1. Interior transport can be reversed for fixed products, but boundary-born mass has no preimage in the previous chamber. Hence the global inverse fails.

130. Memory and forgetting. Old Tier 2; Revised Tier 2. Growth adds information. Projection removes information. This gives a basic memory/forgetting structure:

time writes; observation compresses.

131. Hysteresis. Old Tier 3; Revised Tier 2. The final chamber can be defined directly, but it can also be generated through its full history $1 \to 2 \to \cdots \to n$. The transport view reveals this developmental path.

132. Causality. Old Tier 2; Revised Tier 2. Every contribution in the future chamber is either transported from the past or born at the boundary. Thus each unit of mass has an arithmetic explanation.

133. Genealogy of a cell. Old Tier 2; Revised Tier 2. Tracing a present cell backward either follows transport preimages or stops at a boundary event. This gives each cell an ancestry.

134. Light cone / ancestry cone. Old Tier 3; Revised Tier 2. A present cell has a backward ancestry cone through transport. The light-cone label is metaphorical, but the ancestry structure is real.

135. Maxwell's demon analogy. Old Tier 4; Revised Tier 3. Microscopic coordinate transport can be reversible, while macroscopic support images lose information. This resembles coarse-graining issues associated with Maxwell's demon, but the label is poetic.

136. Initial condition versus rule. Old Tier 2; Revised Tier 2. The complexity is not stored in a complicated initial state. It is generated by a simple repeated rule. This is a strong lawful-generation point.

137. Law / matter / observation triangle. Old Tier 5; Revised Tier 5. This is an organizing slogan: transport is law, support/multiplicity is matter, projection is observation. It summarizes the framework.

138. Three arrows. Old Tier 5; Revised Tier 5. This summarizes three directions: growth, admission, and compression. It is a synthesis of earlier exact mechanisms.

139. Boundary as birth, projection as death. Old Tier 5; Revised Tier 5. Boundary injection creates new visible possibilities. Projection removes detail. This is a poetic but memorable compression of the birth/observation structure.

140. Frustration. Old Tier 2; Revised Tier 2. Different projections simplify different aspects and complicate others. Support, multiplicity, parity, factor space, and Euclidean space each preserve different information. This tradeoff is real.

141. Dual citizenship of numbers. Old Tier 3; Revised Tier 2. Every number has Euclidean coordinates at every base, but it only becomes multiplicative matter when a factor witness is admitted. This gives two kinds of membership: Euclidean and multiplicative.

142. Virtual and actual numbers. Old Tier 2; Revised Tier 2. A number is virtually present when it has Euclidean coordinates, and actually present when it has admitted factor witnesses. This is a strong structural distinction.

143. Boundary actualization. Old Tier 2; Revised Tier 2. A number becomes actual in the multiplication table when the boundary grows enough to admit a factor pair. Boundary growth turns virtual coordinates into visible products.

144. Chamber as laboratory of emergence. Old Tier 5; Revised Tier 5. This summarizes the chamber as a place where automata, probability, arrows of time, support collapse, multiplicity entropy, boundary birth, and parity cancellation all appear from simple rules.

145. The arithmetic loom. Old Tier 5; Revised Tier 5. Multiplication gives threads; Euclidean division gives the loom; transport advances it; boundary injection adds threads; support shows the pattern; multiplicity shows hidden depth; parity shows what remains after cancellation. This is a strong final metaphor.

146. Final slogan set. Old Tier 5; Revised Tier 5. This collects closing slogans such as "coordinates are reversible; growth is not" and "time writes; observation compresses." It is a rhetorical summary of the main structural insights.

Closing for non-specialist readers

The simplest way to understand the whole appendix is this:

$$\text{factor pairs} \longrightarrow \text{products} \longrightarrow \text{Euclidean cells} \longrightarrow \text{visible support.}$$

At each step, information is compressed. The hidden factor pairs are still there, but the visible picture only shows part of the story.

When the table grows from n to $n+1$, old products are transported into a new coordinate frame, while genuinely new products enter from the boundary. This gives the chamber something like motion, birth, memory, and observation, all inside elementary arithmetic.

So the 146 parallels should not be read as 146 physical claims. They should be read as 146 ways of noticing that a small arithmetic machine has a surprisingly large structural vocabulary.