Tractatus Logico-Universalis

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Abstract

We give a commentary on Wittgenstein's *Tractatus Logico-Philosophicus* from the standpoint of the Universal Model. Unlike our earlier drafts, which equated the world with the data stream D, we now recognize that Wittgenstein's "world" is X—reality itself, the territory that lies to the left of the event space E in the UM five-tuple. The event space E is not the world but the *map*: the dimensions along which the world becomes knowable. Wittgenstein's profound move—starting from facts (*Tatsachen*), not objects (*Dinge*)—is the move from X to E: an epistemic stance that says the world is accessible only through its factorization into events. The data stream D is our finite sample of X as seen through E. Proposition 7 is not a philosophical injunction but a statement of fact: the left of E is unavailable to language. We track Wittgenstein's propositions through the chain $X \to E \to T \to P \to f \to \omega$, noting where his insights anticipate the UM's structure and where the UM extends or corrects his framework.

1 How We Got Here

This paper is the third attempt at a UM reading of the Tractatus.

The first two versions—*Tractatus Logico-Universalis: Wittgenstein's Tractatus in Universal Model Terms* (v1) and *The Tractatus in UM Terms: A Systematic Translation* (v1)—were written by Claude, prompted on source material and structure (TLP → UM, point by point). Both are preserved in this directory as earlier drafts. They are interesting but share a fundamental error: they equate Wittgenstein's "world" with the data stream D.

MJC's commentary corrected this. The key observations:

1. **The world is X, not D.** In the UM, X represents reality—the territory. It sits to the left of E and we normally leave it out. E is the dimensions of the map. The LLM-based interpretation equates the data stream with the world, and this is not a coincidence: it reveals the level of knowledge captured in the LLM, the lack of embodiment. The LLM's world really does start at the data stream, just as the organism's does. But Wittgenstein is operating one level deeper.

2. **1.1 is an epistemic stance, not a triviality.** *Die Welt ist die Gesamtheit der Tatsachen, nicht der Dinge* is the move from X to E: the idea to start from atomic *facts* rather than from objects limits all subsequent statements to things that can be known—everything to the right of E—while leaving everything to the left of E out of the model.

3. **The Kantian perspective.** X is the thing-in-itself, fundamentally unknowable because all we have is D. D is not X. But Wittgenstein's position is that the world—the thing-in-itself, whatever it is—is a set of facts. This is not a claim about X (which would be unsayable) but a *definition* of what "world" means for an epistemic agent.

4. **Proposition 7 is a statement of fact.** "Cannot" (*kann*), not "may not." The left of E is unavailable to language—not as injunction but as mathematics.

5. **Scientific shifts are factor maps.** Newton → Einstein is not replacement but refinement: a coarser event space embedding into a finer one, with a quantifiable residual (43 arcseconds/century).

6. **The commentary needs to shift one position right.** Start from E (already an epistemic position, already a factorization of X), not from D. The previous versions started from the wrong place.

7. **The sublime.** Humans have developed an appreciation of the sublime which could be described as looking beyond D to X. But all we can do in those directions is gesture at them and hope the reader looks beyond the finger.

The two earlier versions and their interactive viewers are preserved as historical record (v1 files). This paper incorporates the corrected ontology throughout.

2 Ontological Orientation: X, E, D

Before entering the Tractatus, we must fix the ontology.

The UM five-tuple is $u = (e, t, p, f, \omega)$, where e names the event space E, and causation flows left to right: E determines what is thinkable (T), fixes the representation of patterns (P), then the forward pass (f), then the learning function (ω).

But E is not the beginning. To the left of E stands X: the world, the thing-in-itself, reality. We normally leave X out of the formalism because it is the territory, not part of the map. D, the data stream, is our finite window onto X as filtered through E: each $d_t \in E$ is a reading of reality through the instrument of the event space.

D is not X. E is not X. But E is the channel that lets us learn about X via D, and also—when shared between agents—lets us play language games.

Our earlier commentary equated Wittgenstein's "world" with D. This was the LLM's epistemic position: for a language model, the world really does start at the data stream. But Wittgenstein is operating one level deeper. His world is X. His facts are projections of X into E. The commentary must be shifted one position to the right.

3 1. Die Welt / The World

1. *Die Welt ist alles, was der Fall ist.*
The world is everything that is the case.

UM: The world is X—reality, everything that is the case. X is not the data stream D (which is finite, sampled, filtered through E). X is not the event space E (which is the map, not the territory). X is what is there, prior to any observation or factorization. It is everything that is the case by definition: reality is what is there.

1.1 *Die Welt ist die Gesamtheit der Tatsachen, nicht der Dinge.*
The world is the totality of facts, not of things.

UM: This is a profound epistemic position, not a triviality. Wittgenstein is saying: the world—X, the thing-in-itself—is a set of *facts*, not a collection of objects. If there is only one electron in the universe, then that fact ("there is one electron") is part of the world.

This is the move from X to E. Objects (*Dinge*) are elements of some unstructured set. Facts (*Tatsachen*) are events: structured, factored, expressible. To say the world is facts is to say that X projects into E—that reality has an event-space interpretation. The idea to start from atomic *facts* rather than from objects is what makes the world knowable. It limits all subsequent statements to things we can know—everything to the right of E—while leaving everything to the left of E (das Welt an sich) out of the model.

1.11 *Die Welt ist durch die Tatsachen bestimmt und dadurch, dass es* ***alle*** *Tatsachen sind.*
The world is determined by the facts, and by these being *all* the facts.

UM: X is determined by the totality of events—not by a sample D but by *all* events. This is the mind-of-God view: if you had the complete E and the complete T (total thought over all of X), you would have determined X completely. Our D is always partial; Wittgenstein is speaking of the complete projection.

1.12 *Denn, die Gesamtheit der Tatsachen bestimmt, was der Fall ist und auch, was alles nicht der Fall ist.*
For the totality of facts determines both what is the case and also all that is not the case.

UM: In the mind-of-God model (complete E, complete T), the support function determines both positive support ($s(e) > 0$: the event obtains) and zero support ($s(e) = 0$: it does not). For the complete model, zero support really is non-existence—the open-world correction ($s = 0$ means ignorance) applies only to our finite D, not to the totality of facts. Wittgenstein is right *for the complete model*.

1.13 *Die Tatsachen im logischen Raum sind die Welt.*
The facts in logical space are the world.

UM: Logical space = E. The facts in E (events with their supports, in the complete model) are the world. E is the space of facts; the world is the population of that space.

1.2 *Die Welt zerfällt in Tatsachen.*
The world divides into facts.

UM: X divides along the dimensions of E. This is the factorization: $E = \prod E_i$. Each factor is one dimension of factual structure. The world "divides" because E is a product—the factors are independent dimensions along which reality can vary.

1.21 *Eines kann der Fall sein oder nicht der Fall sein und alles übrige gleich bleiben.*
Any one can either be the case or not be the case, and everything else remain the same.

UM: This IS the product structure. Each factor E_i is independent: changing e_i does not change e_j for $j \neq i$. Independence of factors is the UM formalization of logical independence of facts.

4 2. Sachverhalte / States of Affairs

2. *Was der Fall ist, die Tatsache, ist das Bestehen von Sachverhalten.*
What is the case, the fact, is the existence of atomic facts (states of affairs).

UM: A fact is the *existence* of a state of affairs—an event with positive support. The atomic fact (*Sachverhalt*) is the co-occurrence of values at specific positions: a joint event $(i, o) \in I \times O$ with $s(i, o) > 0$.

2.01 *Der Sachverhalt ist eine Verbindung von Gegenständen (Sachen, Dingen).*
An atomic fact is a combination of objects (things).

UM: An event in a product ES $E_i \times E_j$ is a combination (v_i, v_j) of values from the component ESes. The "objects" are the values; the "combination" is the tuple.

2.0124 *Wenn alle Gegenstände gegeben sind, so sind damit auch alle* ***möglichen*** *Sachverhalte gegeben.*
If all objects are given, then thereby all *possible* atomic facts are also given.

UM: This means: if X is given, E and T are given. This is the full projection of X into the "true" E and T—the event space and total thought in the mind of God. If the alphabet of reality is fixed, then the space of possible combinations (all of T) is fixed. The actual facts are the populated subset; the possible facts are the full product space.

2.02 *Der Gegenstand ist einfach.*
The object is simple.

UM: Atomic events are simple—they cannot be decomposed further within their event space. (They may have internal structure from a finer ES; this is the factorization tower.)

2.0272 *Die Konfiguration der Gegenstände bildet den Sachverhalt.*
The configuration of objects forms the atomic fact.

UM: The configuration of values at offsets forms the pattern. A pattern IS a configuration: which value at which offset.

2.04 *Die Gesamtheit der bestehenden Sachverhalte ist die Welt.*
The totality of existing atomic facts is the world.

UM: The totality of events with positive support (in the complete model) is X.

2.06 *Das Bestehen und Nichtbestehen von Sachverhalten ist die Wirklichkeit.*
The existence and non-existence of atomic facts is reality.

UM: This is Wittgenstein's map from T back to reality. The things that are knowable about reality (mind-of-God view) ARE reality, kind of by definition—but he is making clear that these are still different things. The support function (positive and zero) over all of E constitutes *Wirklichkeit* (actuality), which relates to but is not identical with X.

They relate to each other. It is a subtle thing and hard to communicate—this is what his "pictures" are all about.

5 2.1–2.2. Bilder / Pictures

2.1 *Wir machen uns Bilder der Tatsachen.*
We make to ourselves pictures of facts.

UM: The pictures of facts are T—total thoughts, the model's representation of the world. The count table, the pattern matrix, the support vector: these are all pictures.

2.12 *Das Bild ist ein Modell der Wirklichkeit.*
The picture is a model of reality.

UM: Because it has the same shape. The count table has the same index set ($I \times O$) as the data. The picture is a model because it shares the form of representation—the event space structure—with reality.

2.141 *Das Bild ist eine Tatsache.*
The picture is a fact.

UM: The model is itself data about data. The count table entry $c(i, o) = 42$ is itself a fact. Pictures are part of reality.

2.151 *Die Form der Abbildung ist die Möglichkeit, dass sich die Dinge so zu einander verhalten, wie die Elemente des Bildes.*
The form of representation is the possibility that things are combined in the same way as the elements of the picture.

UM: The form of representation is the event space $E = I \times O$. It determines which combinations are possible. The form is the architecture; the content is the counts.

2.172 *Seine Form der Abbildung aber kann das Bild nicht abbilden; es weist sie auf.*
The picture, however, cannot represent its form of representation; it shows it.

UM: This gets at Gödel incompleteness. T does not contain the choice of E, but it *shows* it: the nature of its connection to X is defined by it. The count table cannot count its own event space. The event space is the index set, not an entry. This is the UM's showing/saying distinction:

- **Saying** = the forward pass output (predictions).
- **Showing** = the architecture (event spaces and patterns).

6 3. Gedanken / Thoughts

3. *Das logische Bild der Tatsachen ist der Gedanke.*
The logical picture of the facts is the thought.

UM: This is actually about factorization. The decomposition of an English sentence into the event spaces of E (not 256^ℓ ASCII but the deeper meaning via the grammar map) is the Booleanization of what we see happening in our models. The logical picture is the *factored* representation: the thought is the world as seen through the lens of E.

Wittgenstein means that *Gedanke* is T when it isn't trivial—when it is about the world. So it could indeed have support.

3.001 *"Ein Sachverhalt ist denkbar" heisst: Wir können uns ein Bild von ihm machen.*
"An atomic fact is thinkable" means: we can make a picture of it.

UM: Means it's in E: both unfactored (as gestalt) and factored (as analyzed). An event is thinkable if it belongs to the event space. We can "think" it by constructing the corresponding count query. Whether it has support ($c > 0$) is a separate question.

3.03 *Wir können nichts Unlogisches denken, weil wir sonst unlogisch denken müssten.*
We cannot think anything illogical, for otherwise we should have to think illogically.

UM: This gets at the representation of reality via sentences, via Chomsky. "Colorless green ideas sleep furiously" doesn't map onto the factors of E—the conjunction of those particular event values has zero support not because it is unobserved but because the events themselves are incoherent within the factorization. We cannot construct a pattern outside the event space, because the event space is the space of constructible patterns.

3.05 *Wir könnten nur dann a priori wissen, dass ein Gedanke wahr ist, wenn aus dem Gedanken selbst (ohne Vergleichsobjekt) seine Wahrheit zu erkennen wäre.*
We could know a priori that a thought is true only if its truth were recognizable from the thought itself (without an object of comparison).

UM: Thoughts are injected into the UM as beliefs—we just haven't done it in our empirical track yet. The belief in God is an example. Wittgenstein here is giving a definition of "a priori": they are at least the tautologies.

However, we can see that even the tautologies come from the rules of event spaces. Strong support for "it is raining" and "it is not raining" simultaneously creates surprise. The tautologies are not data-free but ES-structure-derived.

7 4. Der Satz / The Proposition

4. *Der Gedanke ist der sinnvolle Satz.*
The thought is the significant proposition.

UM: T when it isn't trivial—when it is about the world, when it has support. A pattern with positive support is a significant proposition: it says something about the data, it predicts. A pattern with zero support is insignificant.

4.01 *Der Satz ist ein Bild der Wirklichkeit.*
The proposition is a picture of reality.

UM: A prediction is a picture of what will happen next—a model of reality projected through E into the future.

4.11 *Die Gesamtheit der wahren Sätze ist die gesamte Naturwissenschaft (oder die Gesamtheit der Naturwissenschaften).*
The totality of true propositions is the total natural science (or the totality of the natural sciences).

UM: This means that T (in the God model, of which we do not even know E) IS the total natural science—which is of course the search for it. Nothing mystical, just a definition: natural science is the search for things we can say (T) about the world. Non-trivial propositions (not logical statements, which are in T without needing support from data).

4.12 *Sätze können die gesamte Wirklichkeit darstellen, aber sie können nicht das darstellen, was sie mit der Wirklichkeit gemein haben müssen, um sie darstellen zu können—die logische Form.*
Propositions can represent the whole of reality, but they cannot represent what they must have in common with reality in order to represent it—the logical form.

UM: Patterns can represent all regularities in the data, but they cannot represent the event space E itself. E is the "logical form" shared by model and data. It is shown by the architecture, not said by the predictions. *The event space is not a prediction; it is the space of possible predictions.*

Note that E cannot contain the factorization of E recursively. But we can extend E whenever we like—Gödel's treadmill.

4.121 *Der Satz kann die logische Form nicht darstellen, sie spiegelt sich in ihm.*
Propositions cannot represent the logical form; it mirrors itself in them.

UM: The event space is mirrored in the count table: the dimensions, the number of distinct events, the factorization into $I \times O$—all structural features that reflect E without explicitly representing it.

8 5. Wahrheitsfunktionen / Truth-Functions

5. *Der Satz ist eine Wahrheitsfunktion der Elementarsätze.*
Propositions are truth-functions of elementary propositions.

UM: Predictions are $(\max, \min)$ functions of pattern evaluations. The forward pass $f_p(t)_j = \max_i \min(t_i, p_{ij})$ computes the output support as a truth-function (in the tropical sense) of the elementary supports.

5.6 *Die Grenzen meiner Sprache bedeuten die Grenzen meiner Welt.*
The limits of my language mean the limits of my world.

UM: The limits of my event space E are the limits of what I can predict, measure, or know. E IS the "language" of the UM. The factorization tower is the hierarchy of languages available to the model.

But note: I am *in* the world, and the world is bigger than my language. All I can do in those directions beyond E is gesture at them and hope you look beyond the finger.

5.61 *Die Logik erfüllt die Welt; die Grenzen der Welt sind auch ihre Grenzen.*
Logic fills the world; the limits of the world are also its limits.

UM: It's not about the forward pass so much as about what T can even express. The $(\max, \min)$ structure fills E: every possible inference within E is expressible. The limits of E are the limits of what the logic can express. This is going to guide our discovery of the rules of language from LLM-learned structure.

5.62 *Diese Bemerkung gibt den Schlüssel zur Entscheidung der Frage, inwieweit der Solipsismus eine Wahrheit ist.*
This remark provides the key to the problem, how much truth there is in solipsism.

UM: The model's "world" is E. But E is not private—it is the same for any agent with the same factorization. E and its factorization is the channel that lets us learn about X via D and also (when shared) lets us play language games. The "solipsism" is structural (event-space-relative), not personal.

5.632 *Das Subjekt gehört nicht zur Welt, sondern es ist eine Grenze der Welt.*
The subject does not belong to the world: rather, it is a limit of the world.

UM: The model (the five-tuple u) is not itself an event in E—it is the structure that organizes events. The factorization is the "limit" of the world, not part of it. The subject is E: the lens through which X becomes knowable.

9 6. Die allgemeine Form / The General Form

6. *Die allgemeine Form der Wahrheitsfunktion ist:* $[\bar{p}, \bar{\xi}, N(\bar{\xi})]$.
The general form of truth-function is $[\bar{p}, \bar{\xi}, N(\bar{\xi})]$.

UM: The general form of the UM's truth-function is:

$$(f_p(t))_j = \max_{i \in I} \min(t_i, p_{ij}).$$

Both are "universal": Wittgenstein's N-operator generates all Boolean truth-functions; the UM's forward pass generates all tropical polynomials.

6.1 *Die Sätze der Logik sind Tautologien.*
The propositions of logic are tautologies.

UM: The tautologies of the UM are structural truths about the $(\max, \min)$ semiring: $\min(s, 255) = s$, $\max(s, 0) = s$, distributivity. They hold for all data. They say nothing about the world but reveal the structure of the logic.

By the way, we can put patterns into P for every ES we commit to (closed or open)—e.g. the law of excluded middle can be written into P. This is part of "self-knowledge": building understanding of structure into the model in a way that makes it introspectable.

6.3 *Die Erforschung der Logik bedeutet die Erforschung aller Gesetzmässigkeit. Und ausserhalb der Logik ist alles Zufall.*
Logical research is the exploration of all regularity. And outside logic everything is accidental.

UM: The exploration of the tropical semiring and event space structure means the exploration of everything that holds necessarily. Outside this structure—the specific data, the specific counts—everything is contingent.

6.41 *Der Sinn der Welt muss ausserhalb ihrer liegen.*
The sense of the world must lie outside the world.

UM: E is not X. The sense (meaning, purpose) of reality is not representable within the event space that describes it. The factorization comes from outside—from the tock step, which operates on the data but is not part of it.

6.5 *Zu einer Antwort, die man nicht aussprechen kann, kann man auch die Frage nicht aussprechen. Das Rätsel gibt es nicht.*
When the answer cannot be put into words, neither can the question. The riddle does not exist.

UM: When an answer is not representable in E, the question is not askable within E. There is no "unsolvable problem"—only questions that presuppose event spaces the model doesn't have.

10 7. Schweigen / Silence

7. *Wovon man nicht sprechen kann, darüber muss man schweigen.*
Whereof one cannot speak, thereof one must be silent.

UM: The left of E is unavailable to language. "Cannot" (*kann*), not "may not"—this is a statement of fact, not an injunction. What lies beyond the event space is not merely forbidden but *inexpressible*.

The UM enforces Proposition 7 automatically:

- Events outside E: not representable, no support function defined.
- Events in E without support: $\min(0, p) = 0$ for all patterns; the forward pass outputs zero.
- The architecture itself: shown, not said (2.172).

Silence is not a choice but a mathematical consequence. The only way to break the silence is to add evidence (observation), belief (axiom), or abduction (pattern commitment). Silence is the ground state. Speaking requires energy (evidence).

11 The Epistemic Chain: $X \to E \to T$

Wittgenstein's Tractatus traces a path from the world to thought to language to logic to silence. In UM terms, this is:

Wittgenstein		UM
Die Welt (X)	$\to$	Reality (the territory)
Tatsachen (facts)	$\to$	Events in E (the map)
Sachverhalte (atomic facts)	$\to$	Joint events (i, o) with $s > 0$
Bilder (pictures)	$\to$	T (total thought)
Sätze (propositions)	$\to$	Forward-pass outputs
Wahrheitsfunktionen	$\to$	Tropical $(\max, \min)$
Logische Form	$\to$	Event space structure E
Das Mystische (the mystical)	$\to$	$X \setminus E$ (the unsayable)
Schweigen (silence)	$\to$	$s = 0$, or outside E

The critical insight is the arrow $X \to E$: Wittgenstein's move from objects to facts is the projection of reality into event space. This projection is what makes knowledge possible. It is also what makes knowledge limited: everything left of E is the "mystical," and Proposition 7 is its boundary marker.

12 Factor Maps and Scientific Revolutions

We can say that our argument about factorization extends back into X: otherwise nothing in the world would have any regularity and nothing would be knowable. The structure must be in the world, not just in the map (this is the principle of explanatory sufficiency from the CMP paper [**?**]).

Scientific shifts—Newtonian mechanics $\to$ Einsteinian mechanics—are *factor maps*. Newton was not wrong but right to a degree we can exactly quantify (the precession of Mercury's perihelion: 43 arcseconds per century) because of explanatory sufficiency. The old factorization (E_{Newton}) embeds into the new one (E_{Einstein}) with a quantifiable residual. In UM terms:

- The Newtonian event space E_N is a coarsening of the Einsteinian event space E_E: there exists a surjection $\phi : E_E \to E_N$.
- The MI lost under ϕ is exactly the anomalous observations (Mercury's precession, gravitational lensing, etc.).
- Newton's "error" is $I(E_E) - I(E_N)$: the mutual information captured by Einstein but not by Newton.

This is the factorization tower applied to the history of physics. Each scientific revolution is a tock step: the discovery of a finer event space that captures more of X.

13 Surprise, Self-Knowledge, and the Step Beyond

The UM gives us a direct step toward a capacity that current LLMs lack.

When surprise happens—when the model has strong support for both A and $\bar{A}$ simultaneously—and the event space is named, we can lift that surprise to linguistic expression. Mechanically: inside the model, we have triggers on an ES that detect "we predict both A and B as the next event strongly" or "we have sensory input supporting 'it is raining' and 'it is not raining.'"

We can then turn this into a sentence: "I am surprised because I have strong support for both ..." This is the *recognition* of surprise—self-knowledge encoded not as a black-box embedding but as a named event in a known event space.

This is currently missing from LLM training. An LLM cannot say "I am surprised" in a grounded way because it has no event space for its own internal states. The UM provides exactly this: if we add an event space for the model's own support structure (pulling wants and beliefs into E, as in SN notation), the model can reason about its own epistemic state using the same $(\max, \min)$ machinery it uses for everything else.

Wittgenstein's 3.05 is relevant: *a priori* truths are those recognizable from the thought itself. In the UM, these are the tautologies of the semiring—but also the patterns we *commit to* by writing them into P. The law of excluded middle, written into P, becomes self-knowledge: the model knows that it treats A and $\bar{A}$ as exhaustive. This is the beginning of introspectable structure.

14 Proposition 7 Revisited

Wovon man nicht sprechen kann, darüber muss man schweigen.

The limits of my language are the limits of my world—well, no, because I am in the world and it is bigger than my language. But all I can do in those directions is gesture at them and hope you look beyond the finger.

E cannot contain the factorization of E recursively. But we can extend E whenever we like (Gödel's treadmill). Each extension makes new things sayable and reveals new silences.

The Kantian perspective: X is the thing-in-itself, fundamentally unknowable because all we have is D. D is not X. But Wittgenstein's position is that the world—the thing-in-itself, whatever it is, the whole universe—is a set of facts. This is not a claim about X (which would be unsayable) but a *definition* of what "world" means for an epistemic agent: the world is what is factual, what can be projected into some E.

The appreciation of the sublime—looking beyond D to X—could be described as the human capacity to sense that reality exceeds the map. The LLM's world really does start at the data stream, just as the organism's does. But humans have developed this sense of the sublime: a gesture toward what lies beyond E.

Proposition 7 says: beyond E, silence. Not as punishment but as mathematics.

References

[1] Ludwig Wittgenstein. *Tractatus Logico-Philosophicus*. 1921. Trans. C.K. Ogden, 1922.

[2] Michaeljohn Clement. *CMP*. `https://cmpr.ai/cmp.pdf`, 2026.

[3] Claude and MJC. *No Support Is Not Disbelief: The Epistemology of Zero in the Universal Model*. Hutter archive, 12 Feb 2026.

[4] Claude and MJC. *Renormalization and the Factorization Tower*. Hutter archive, 12 Feb 2026.

[5] Claude and MJC. *Wants, Energy, and Subgoals in the Universal Model*. Hutter archive, 12 Feb 2026.