No Cycles in Acts: A Polemical Reply to Friebe (2016) on CTCs, "Time Direction," and Presentist Consolations

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February 28, 2026

1 The target: a typical inversion

Thesis of the pamphlet. The genre we oppose in this note can be summarized in one inversion: *(i) representation fails ⇒ (ii) ontology fails*. Friebe [1] is a clean specimen: from the absence of a globally consistent time order (in certain spacetimes with CTCs) he infers the primacy of "time direction" and then advertises presentism as the "adequate ontology."

Our claim. What fails in CTC-talk is not "time" but the habit of mistaking a geometric encoding for the thing encoded. Geometry does not contain time; it contains structures. If a structure cannot encode well-founded order, it is the structure that is insufficient for ontological conclusions.

2 Geometry does not contain time

General relativity provides a geometric structure: a differentiable manifold equipped with a pseudo-Riemannian metric. From this structure one obtains classifications of vectors, local causal cones, and various global topological possibilities. None of these objects is time.

There is no global temporal parameter in the theory. There is no primitive notion of earlier or later. There is no built-in requirement that events be well-foundedly ordered. These absences are not flaws; they are deliberate features of a representational framework designed for covariance, not for ontology.

At this point a basic reminder is in order.

Geometry is not primordial. Geometry itself is a historical invention, roughly twenty-five centuries old. To treat a geometric formalism as the ontological source of time is therefore to accept an absurd implication: that nothing truly happened before the conceptual emergence of geometry. This is the familiar recursion of the house that Jack built, now elevated to metaphysics.

Of course, no serious physicist believes this. Events occurred long before geometry was formalized. Temporal succession was operative long before manifolds, metrics, or cones were conceived. Geometry did not generate time; it was introduced to *describe* certain regularities in how events can be related and accessed.

This point becomes decisive once the role of the actor is made explicit.

Remove the actor. Ask what remains of the theory if the human observer, recorder, or comparing agent is removed from the picture. Events may still occur. Geometric relations may still hold. But general relativity no longer exists as a theory. What remains is a structure without access, comparison, serialization, or fixation.

This is not a criticism of general relativity. It is a clarification of its status. General relativity does not describe time as such; it describes how geometric structures constrain possible observations by agents embedded in those structures. Without an actor, there is no temporal access, and without temporal access there is no time in the sense required for order.

A closed timelike curve is therefore a purely geometric object: a closed curve whose tangent vectors satisfy a sign condition imposed by the metric. Calling such a curve "temporal" is already an interpretive act. Calling it a "time loop" is rhetoric layered on top of geometry.

The mistake begins when geometric classification is mistaken for ontological commitment. That a curve is everywhere classified as timelike does not mean that the acts associated with that curve are temporally cyclic. It means only that the chosen formalism does not encode act-order.

In short: geometry may constrain how time can be accessed, but it neither generates time nor licenses conclusions about the structure of history. To infer the nature of time from the expressive limits of geometry is to confuse a late representational tool with the conditions of reality it was designed to describe.

2.1 A note on the historical stack of dependencies

It is worth fixing, explicitly and without polemics, the point of departure from which Friebe's argument operates.

The chain of dependence is straightforward. Friebe's conclusions rest on general relativity. General relativity rests on differential geometry. Differential geometry rests on arithmetic and formal logic. Each layer is a representational achievement, historically introduced to organize and compress certain classes of experience.

Nothing is wrong with this stack as such. What becomes problematic is the direction of inference. To draw ontological conclusions about time from a particular class of solutions of general relativity is already to stand several abstraction layers away from empirical ground.

This distance matters. The specific spacetime models invoked in CTC discussions (Gödel-type and related solutions) are not established by direct empirical evidence. They are mathematically admissible constructions within a formal framework, not experimentally confirmed features of the actual world. Their role is exploratory, not evidential.

The methodological error occurs when such constructions are treated as revelations about ontology rather than as stress tests of a representational language. At that point, abstraction is mistaken for discovery.

In historical perspective, this places Friebe's argument at the top of a long ladder of formal dependencies. The higher one stands on that ladder, the greater the burden of restraint in ontological claims.

This mistake is not exceptional. It is one of the most persistent errors in the history of philosophy and science: to treat late representational tools as conditions of reality itself. Kant's philosophy provides a canonical example. Once it is acknowledged that mathematics and logic are not innate structures of the observer, but historically developed representational practices, the transcendental edifice loses its necessity. Replace the human observer with a frog in a pond, and the supposed a priori forms of intuition simply disappear. Events still occur. Temporal succession still holds. What vanishes is not time, but the philosophical superstructure built upon a specific observer.

The lesson generalizes. Ontological conclusions drawn from representational schemes silently assume the universality of the observer for whom those schemes were devised. Once this assumption is dropped, the inference collapses.

Absent new empirical constraints, the responsible conclusion is methodological modesty, not metaphysical revision.

To forget this is to invert the order of explanation: to let late representational tools dictate what must have been the case long before those tools existed.

3 Act-order, access-order, representation-order

Any serious discussion of time requires a strict separation of three distinct notions of order. These notions are not competing descriptions of the same thing. They form a hierarchy of abstraction, produced by successive compressions of empirical content into formal structure.

With each new layer of "science," empirical richness is progressively condensed into mathematics. This compression is productive, but it comes at a cost: what is gained in formal power is lost in ontological immediacy. Confusion arises precisely when the direction of this compression is forgotten.

We therefore distinguish three orders, not as causal layers, but as an ontological sequence of "nextness": each level is subsequent to the previous one, not because it is caused by it, but because it presupposes it.

- **Act-order (ontological).** The canonical precedence relation between acts or events. This order consists in the simple fact that something happens *after* something else. It is not a coordinate, not a metric, and not a foliation. Without act-order, the notion of an act collapses into an atemporal abstraction.
- **Access-order (epistemic).** The order in which acts become available to an observer, instrument, or recording system. It is partial, revisable, and expandable. Gaps, re-identifications, delays, and apparent loops belong here.
- **Representation-order (formal).** Any order induced by a chosen formalism: coordinate time, foliation, parameterization, global functions, or geometric classifications. This order is maximally compressed and minimally ontological.

The direction matters. Representation-order presupposes access-order; access-order presupposes act-order. The reverse inference is invalid. To reason from representation back to ontology is to mistake a compression artifact for a feature of reality.

The entire metaphysical burden placed on closed timelike curves depends on collapsing these distinctions. A failure at the level of representation-order is misread as a failure of act-order. An ambiguity in access-order is promoted to an ambiguity of being.

This collapse is methodologically indefensible. Act-order is not defined by representation, and access does not generate ontology. A formalism that cannot encode a given invariant has thereby revealed its own limits, not the non-existence of the invariant itself.

In short: what comes *next* in abstraction must not be confused with what comes *next* in reality.

4 Act_0: initiation, not "act -1"

The distinction between act-order, access-order, and representation-order is not terminological housekeeping. Once these orders are separated, a structural problem becomes unavoidable.

Act-order cannot be defined as an infinite regress of precedences. If every act required a prior act in order to be ordered, then order itself would never begin. Representation-order may tolerate such regressions as formal devices, but act-order cannot: an act without initiation is not unordered; it is undefined.

This is the sole motivation for introducing Act_0.

We introduce the notion of Act_0 as a minimal structural postulate. It is not an explanatory hypothesis, not a physical event, and not a metaphysical narrative. Its role is purely formal: to render act-order non-circular and well-founded.

Principle 4.1 (Initiated Order (Act_0))**.** *There exists an initiating act Act_0 such that act-order is defined only* after *Act_0. Act_0 is not a member of the ordered chain as "the first among others;" it is the initiation of countability itself.*

Act_0 is not observable, not repeatable, and not comparable. No claim is made about its physical realization, temporal duration, or causal structure. These questions are deliberately left open. What matters is only that without initiation, the very notion of precedence is undefined. **Consequence.** The question "what was act -1?" is not deep; it is malformed. It presupposes a predecessor relation in a domain where predecessorhood has not yet been defined. To ask for an act prior to Act_0 is to forget that ordering itself begins with initiation.

This point cuts off an entire class of pseudo-problems. There is no infinite regress of acts, no need for a self-supporting cycle, and no motivation for replacing order with "direction." Once initiation is acknowledged, act-order is linear in the only sense that matters: no act can be its own predecessor.

Importantly, Act_0 is accepted in the same methodological spirit in which physics accepts fundamental invariants. It is not treated as a final answer, but as a necessary condition for the coherence of the theory. Our ignorance of its nature is an epistemic limitation, not an ontological defect.

With Act_0 in place, cycles of acts become impossible by construction. What may still appear as a "loop" can only arise at the level of representation or identification, never at the level of act-order itself.

5 Historical invariance under extension of temporal access

We now state the decisive point without qualification.

Principle 5.1 (Historical Invariance)**.** *No extension of temporal access can retroactively extend the history of acts. Adding clocks, observers, channels, synchronizations, or coordinate descriptions may increase what is observed or reconstructed, but it cannot add what has occurred. Access expands; history does not.*

This principle is not a physical prohibition and not a metaphysical thesis. It is a structural invariant. History is not a writable medium. Temporal access is read-only.

Lemma 5.1 (No retroactive novelties)**.** *No new act can appear "backdated" by the mere introduction of an additional temporal source. Any such appearance is necessarily a re-identification, a re-labeling, or a re-serialization of acts already present in history.*

The distinction is absolute. Extending access may reorder descriptions, resolve ambiguities, or expose inconsistencies in prior representations. It cannot generate ontological novelty in the past.

Punchline. "We do not know the beginning" is not a mystical limit of being and not a consequence of physical inaccessibility. It is the trivial consequence of the fact that history does not rewrite itself when the set of readers grows.

6 Why "time direction" is not a rescue

Friebe's central maneuver is to replace failed time order with allegedly more fundamental "time direction." This replacement solves nothing.

If "direction" is understood as time-orientability, it is a property of a geometric structure. It classifies tangent vectors. It does not order acts. Calling this property "time" is a terminological inflation.

If "direction" is instead understood as a metaphysical "productive Now," then it is not derived from the formalism at all. It is imported as an auxiliary narrative to compensate for a representational failure. Such importation explains nothing; it merely relocates the confusion.

Claim 6.1 (Direction without order is vacuous)**.** *In the absence of act-order, "time direction" either collapses into a conventional labeling of models or survives only as a metaphysical slogan. In neither case does it ground ontology.*

Replacing order with direction does not clarify the status of time. It merely obscures the original mistake: confusing limits of representation with features of reality.

7 On belief as a structural consequence

The notion of belief enters this discussion not as a psychological state and not as a subjective attitude, but as a structural consequence of initiated order and historical invariance.

To believe that a future act will occur is to treat the initiated sequence of acts as extendable, even though its future content is not yet fixed. Belief is therefore not a hypothesis about hidden causes, but a commitment to the continuity of act-order under incomplete access.

In this sense, belief is unavoidable. If act-order were not presumed to persist, no projection, no planning, and no responsibility would be coherent. Conversely, belief does not imply knowledge: to believe that an act will occur is precisely to acknowledge that it has not yet occurred.

This clarifies the asymmetry between past and future. The past is invariant under any extension of temporal access; the future is not invariant, because it is not yet part of history. Belief occupies exactly this asymmetry: it is oriented toward acts that are not yet fixed, but assumed to be reachable within the same initiated order.

Critical point. Belief does not arise from ignorance of the past, but from the impossibility of retroactively altering it. Because history is closed, the only open dimension is extension. Belief is the rational stance toward that openness.

Under this reading, belief requires no metaphysical supplement. It does not presuppose intention, teleology, or inner states. It is a structural feature of any system that distinguishes initiated history from extendable order.

Theorem 7.1 (Uniqueness of Canonical History under Multi-Observer Fixations)**.** *Let $\mathcal{A}$ be the set of acts and let $\prec$ be the act-order (canonical precedence). Assume that canonical history is defined as a well-founded, initiated chain starting after* Act_0.

For each observer i let O_i be an observational channel that yields a partial record R_i (an access-order sequence, possibly with gaps, noise, and re-identifications). Let Π_i be the projection from canonical history to the record:

$$\Pi_i(H) = R_i,$$

where Π_i may be non-injective (different canonical states may map to the same record) and non-surjective (some records may be incomplete).

Assume:

1. ***Act-order uniqueness (no split canon).*** *For each name/object of discourse, there exists at most one canonical history H consistent with $\prec$ (uniqueness of the source).*

2. ***Historical invariance (read-only canon).*** *If $H \preceq H'$ (i.e., H' extends H by additional acts), then H is a prefix of H'; past acts are not altered by extension.*

3. ***Observer extension is access-extension.*** *Extending temporal access (adding observers, clocks, channels, synchronizations) refines the family of records $\{R_i\}$ but does not modify H.*

Then:

1. ***There is exactly one canonical history for a fixed past.*** *If two canonical histories H_1 and H_2 share the same past prefix (the same acts up to some point) and both are consistent with $\prec$, then $H_1 = H_2$ on that past prefix; no alternative canonical past exists.*

2. ***"Alternative histories" arise only as alternative reconstructions.*** *If two reconstructions $\widehat{H}_1$ and $\widehat{H}_2$ are both compatible with the same observational family $\{R_i\}$, then this non-uniqueness is entirely due to the non-injectivity / incompleteness of the projections Π_i. It does not entail the existence of two canonical histories.*

In particular, multiplicity of observer fixations implies at most multiplicity of descriptions *(access-histories), not multiplicity of* history itself.

Proof. By (1), the source is unique: canonical history cannot branch into two distinct histories consistent with the same act-order $\prec$. By (2), extension cannot rewrite the past, so any later

state preserves the same past prefix. By (3), adding access only refines records $\{R_i\}$ and cannot change H.

Thus, any apparent multiplicity arises only because different canonical states can project to the same record (non-injective Π_i) or because records are incomplete. Hence, "alternatives" are epistemic (multiple $\widehat{H}$ compatible with the same $\{R_i\}$), not ontological (multiple H). The canonical past remains unique. □

Corollary 7.1 (Fixation Eliminates Alternativity)**.** *For any act a, once a is fixed into canonical history, it cannot remain an alternative continuation. Alternativity is therefore a pre-fixation property only.*

8 Conclusion: stop worshipping the representational idol

The contemporary discourse on closed timelike curves is valuable only in a negative sense. It functions as a diagnostic tool: it exposes the precise point at which a formalism fails to encode the ontological invariants it silently presupposes. Beyond this diagnostic role, it yields no insight into the nature of time.

The persistent temptation is to treat this failure as metaphysical. When a global time function cannot be defined, authors announce the "breakdown of temporal order" and rush to install compensatory doctrines: presentism, a "productive Now," or a supposedly more fundamental "time direction." These moves do not resolve the problem. They merely replace one confusion with another.

The correct conclusion is not ontological but methodological. Time is not geometry. Order is not a coordinate. History is not rewritten by the expansion of access or the refinement of description. To infer features of reality from the expressive limits of a representational scheme is not philosophical depth but category error.

Once act-order is distinguished from access and representation, and once initiated order and historical invariance are acknowledged, the apparent paradoxes dissolve. What remain are loops in description, not loops in acts; limitations of models, not failures of time.

Final statement. Time may extend. History does not.

References

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[3] J. Earman, C. Smeenk, and C. Wüthrich, "Do the laws of physics forbid the operation of time machines?" *Synthese*, vol. 169, no. 1, pp. 91–124, 2009.