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Editorial Office
Synthese
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Dear Editors,

I am pleased to submit the manuscript "Oscillatory Incompleteness: Gödel, Symbol Formation, and High-Dimensional Dynamics" for consideration in *Synthese*.

This paper proves a Gödel-style incompleteness theorem for oscillatory dynamical systems that generate symbolic codes via coarse-grained observation. The technical result—that such systems inherit incompleteness when they can encode arithmetic—follows from established work on dynamical systems and computation (Moore 1990, Platzer 2012). Our contribution is interpretive: we argue that incompleteness arises specifically from the *dimensional mismatch* between high-dimensional pre-symbolic dynamics and low-dimensional symbolic codes.

The paper connects several areas within Synthese's scope:

- **Foundations of mathematics**: We provide a physical interpretation of Gödel's theorems, recasting incompleteness as a consequence of code formation rather than syntactic self-reference.
- **Philosophy of science**: The framework applies to any physical system that generates discrete states from continuous dynamics—including neural systems and broader biological contexts.
- **Formal methods**: We offer a categorical reformulation using coalgebras and topos-theoretic language, connecting to recent work on arithmetic universes.

The manuscript includes:

- Formal definitions and three theorems with complete proofs (main text sketches, appendix details)
- Application to neural oscillatory dynamics
- Discussion of scope beyond neuroscience (cellular, ecological, cosmological)
- Simulation code demonstrating the core constructions (available on GitHub)

This work has not been published elsewhere and is not under consideration at another journal. The manuscript is approximately 7,500 words (16 pages double-spaced).

I believe this paper will interest Synthese's readership in philosophy of mathematics, philosophy of

science, and formal methods, offering a novel physical grounding for one of logic's most celebrated results.

Sincerely,

Ian Todd
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