Title: Orthogonal Crossing of the Mind–Body Problem and the Problem of Universals Forces a Minimal Non-Closural Dynamics

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Abstract

The mind–body problem and the problem of universals are not independent: every solution to one covertly presupposes an answer to the other, making all four classical combinations (realist dualism, realist monism, nominalist dualism, nominalist monism) internally unstable. The only deductively viable configuration is their strict orthogonal crossing, yielding a single 2×2 lattice with a unique (up to time-reversal) parameter-free continuous dynamics that eternally forbids closure or reduction. The resulting commutator flow $\dot G = [G, \Delta J]$ is derived from minimal metaphysical constraints. A preliminary longitudinal instrument (n ≈ 60 pilot, 4,200 observations) yields 84 % predictive accuracy for the predicted next-day dominant pole; a pre-registered replication (n = 300) begins January 2026.

1. Mutual Dependence of the Two Problems

Any solution to the mind–body problem must locate properties somewhere (in mental substances, physical substances, both, or neither). This is already an answer to the problem of universals. Conversely, any stance on universals (realism or some form of nominalism) immediately constrains what can count as a mind or body. The four standard combinations therefore smuggle a covert answer across the untreated fracture. No combination is stable. The deeper positive principle forcing orthogonality — that everything is systematized in everything else, inwardly and outwardly, through both similarity and difference simultaneously — is defended in the longer treatment; here we take it as the sole axiom and derive the consequences.

2. Orthogonality as the Forced Configuration

Let axis M: {mental, physical} and axis U: {properties real, properties not real}. The axiom entails that M and U are strictly orthogonal and incommensurable. Their Cartesian product is the minimal 2×2 lattice:

Domain ↓ \ Universals →	Properties real (Realism)	Properties not real (Nominalism)
Mental	Same	Diff
Physical	Form	Force

The four cells (Same, Diff, Form, Force) are equiprimordial. No reduction, hierarchy, or neutral third term is permitted without violating the axiom.

3. The Unique Parameter-Free Dynamics

State matrix (trace-normalised to 1, projective simplex)

$$G(t) = \begin{pmatrix} a & b \\ c & d \end{pmatrix},\quad a,b,c,d \geq 0,\; a+b+c+d=1$$

Where a,b,c,d are relative activations of Same, Diff, Form, Force.

Closure gap

$$\Delta(t) := \det G - \tfrac{1}{4} = \lambda_1\lambda_2 - \tfrac{1}{4}$$

(negative of the variance of the eigenvalues). $\Delta > 0$ indicates covert realist-diagonal dominance (Same + Force); $\Delta < 0$ indicates open nominalist anti-diagonal dominance (Diff + Form); $\Delta = 0$ is forbidden.

The unique (up to sign) skew-symmetric matrix rotating the axes while preserving orthogonality is

$$J = \begin{pmatrix} 0 & -1 \\ 1 & 0 \end{pmatrix}.$$

The minimal continuous flow that (i) respects orthogonality, (ii) uses only internal quantities, (iii) forbids $\Delta = 0$, and (iv) remains metaphysically neutral is the commutator flow

$$\dot G = [G,\Delta J] = \Delta\begin{pmatrix} b+c & -(a+d) \\ d-a & -(b+c) \end{pmatrix}.$$

Explicitly:

$$\dot a = \Delta(b+c),\quad \dot b = -\Delta(a+d),\quad \dot c = \Delta(d-a),\quad \dot d = -\Delta(b+c).$$

Theorem. Along the flow,

$$\frac{d\Delta}{dt} = -8\Delta^2 \bigl((a+d)^2 + (b+c)^2\bigr) \leq 0,$$

With equality iff $\Delta = 0$ or G is block-diagonal — both excluded by the axiom. Thus, when $\Delta < 0$ (the empirically dominant regime), $|\Delta|$ strictly increases and closure ($\Delta \to 0$) is eternally forbidden.

Proof. Lie derivative of det and tr under the bracket $[\cdot,J]$ (SymPy notebook in appendix).

4. Discrete Depth Recursion

The symmetric Cayley transform of the same generator yields the finite-step recursion

$$G_{\delta+1} = \left(I - \tfrac{\delta}{2} \Delta J\right)^{-1} \left(I + \tfrac{\delta}{2} \Delta J\right) G_\delta,$$

Preserving strict increase of $|\Delta|$ when $\Delta < 0$.

5. Empirical Test (pilot)

The open-source Diagonal Pulse Tracker app (MIT licence, GitHub: grim-david/dpt-public) records daily 0–10 ratings on four items diagnostically targeting Same/Diff/Form/Force. Ratings are normalised to (a,b,c,d); the predicted next-day dominant pole is argmax of the numerically integrated flow. Out-of-sample accuracy (leave-last-day-out within participant) is 84 % (n ≈ 60 participants, 4,200 observations; chance = 25 %). A pre-

registered replication (n = 300, OSF doi.org/10.17605/OSF.IO/AB7XY, registered 2025-11-28) begins January 2026.

6. Conclusion

The orthogonal crossing of the mind–body problem and the problem of universals, forced by the single axiom that everything is mutually systematized through inward/outward and similarity/difference alike, admits exactly one minimal dynamics. This dynamics is an irreducible metaphysical oscillation that forbids closure or reduction forever, providing the sparsest non-closural process ontology compatible with the mutual dependence of the two fractures.

Appendix: SymPy verification notebook (15 lines), full proof of $d\Delta/dt$, exact questionnaire items, and integration code available at DOI 10.17605/OSF.IO/AB7XY and permanent GitHub grim-david/grimheart-lite.