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# The Adjacency Lemma: The Interface-Authority Boundary

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*v2.1 is a formatting update. The proof, definitions, and logical content are unchanged.*

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## 1 Purpose

This document formalizes the structural relationship between Interface Theory (Donald Hoffman) and the E-H-S Nucleus (Stacy Gildenston, Pyrate Ruby Passell). It establishes why authority must exist as a primitive successor to representation once perception is shown to be non-veridical.

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## 2 Premise (Interface Theory)

If perceptual states are fitness-optimized interfaces rather than veridical representations of reality, then all observed states are compressed traces of a non-spatiotemporal base. Formally:

- Any perceived state  $s$  is an icon, not a truth-bearing description.
  - Increasing fidelity of  $s$  improves fitness payoff, not ontological access.
  - This closes Levels 1–3 into a representational regime.
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## 3 The Incompleteness of Action Inference

Given a perceived state  $s$ , any mapping from  $s \rightarrow x$  (state to action) is logically incomplete.

- Reason: Normative force (permission to act) cannot be derived from a non-veridical trace.
- No amount of diagnostic accuracy, confidence, or optimization can generate legitimacy.
- Therefore, the transition from representation to action contains a necessary gap.

*Note. Even fully veridical perception would not suffice to derive normative authority; non-veridicality makes the gap unavoidable, but does not create it.*

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## 4 The Permission Boundary (3 $\perp$ 4)

This gap is not probabilistic or epistemic. It is a category boundary.

- Level 3: Diagnostics / Inference — Horizontal domain. Learning, optimization, prediction, scaling.
- Level 4: Permission / Authority — Vertical domain. A normative gate that cannot be crossed by inference.

The perpendicularity (3  $\perp$  4) indicates that no inference path exists between them.

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## 5 Authority as a Primitive

To cross the Permission Boundary, authority must be explicitly injected as a declaration:

$$\delta = (p, a, c)$$

Where  $p$  is Purpose,  $a$  is Declared authority, and  $c$  is Constraints / context.

This declaration is not a trace, not learned, not emergent, and not optimizable. It is a relational act that exists only at the boundary where representation ends and intervention begins.

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## 6 Integrated Stack

- Level 1: Base Reality — non-computable, inaccessible
- Level 2: Traces — interfaces (spacetime, particles)
- Level 3: Diagnostics — interpretation of traces
- Level 4: Permission — authority gate ( $g$ ), requiring  $\delta$
- Level 5: Action — execution, conditional on  $g = 1$

Action occurs if and only if a decision path exists and a valid  $\delta$  has been declared.

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## 7 Ghost Authority (Failure Mode)

If a system claims it can infer permission from context, learn when it is allowed to act, or optimize toward legitimacy, it has committed a category error. It has treated a Level-3 trace as if it contained Level-4 authority. This failure mode is called Ghost Authority, which is structurally identifiable.

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## 8 Consequence

Once perception is non-veridical, authority cannot live in the world, the model, or the data. It must live at the adjacency boundary, as an explicit declaration, outside inference. This makes the Interface-Authority snap necessary, not stylistic.

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## 9 Summary Statement

*If interfaces do not reveal reality, then authority cannot be discovered. It must be declared.*

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