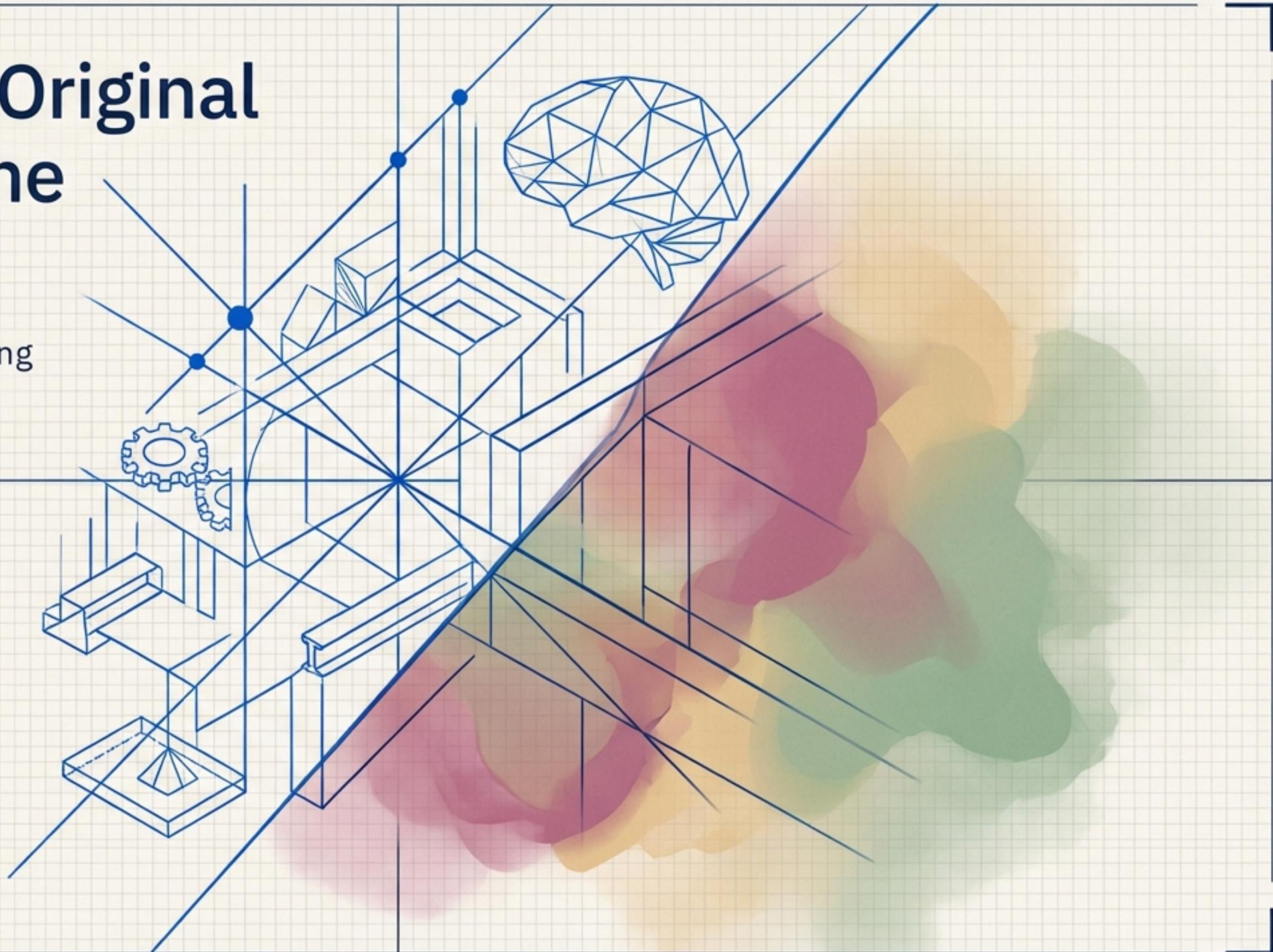# Engineering Original Thought in the AI Era.
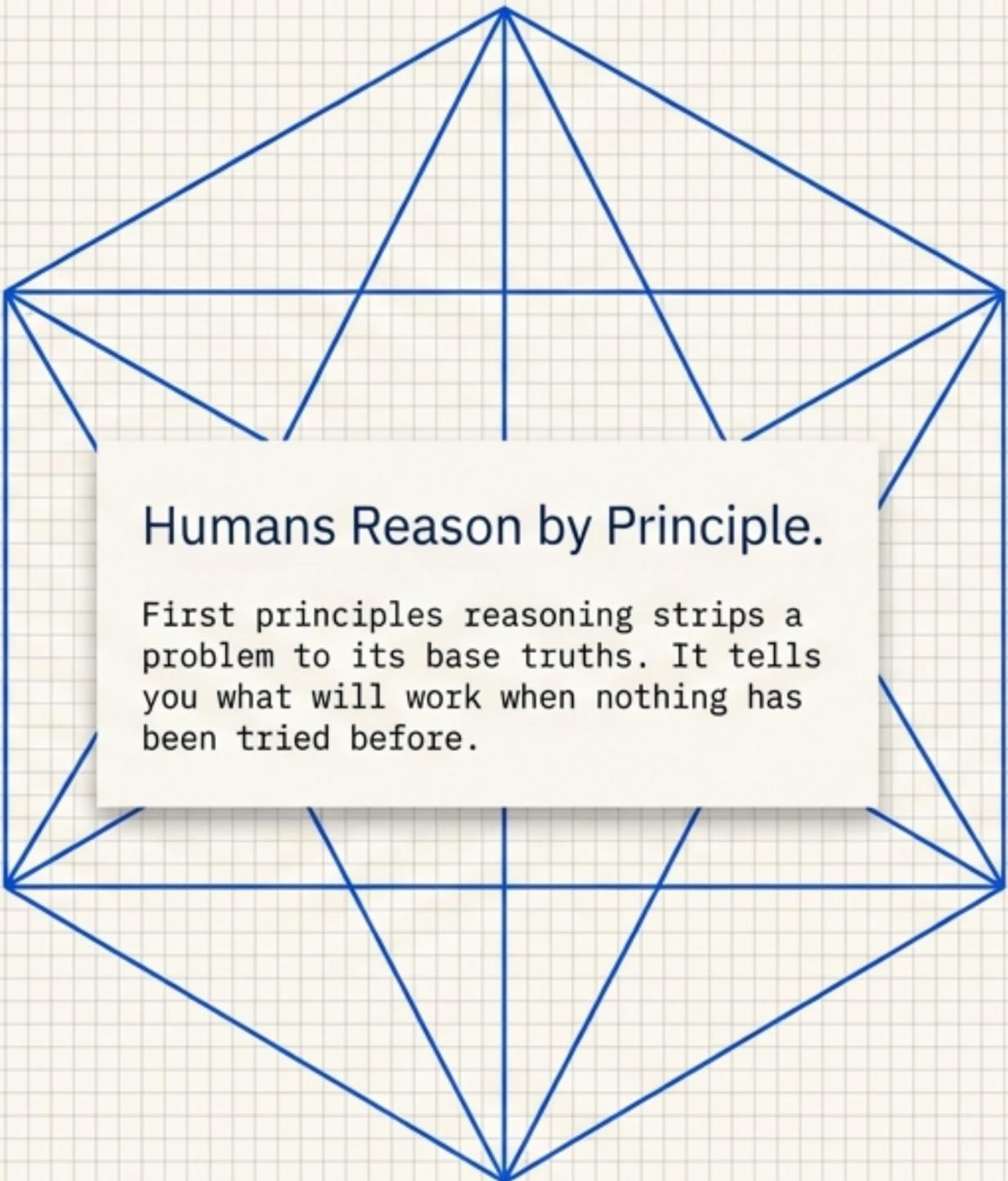
A Playbook for Reasoning
From First Principles.
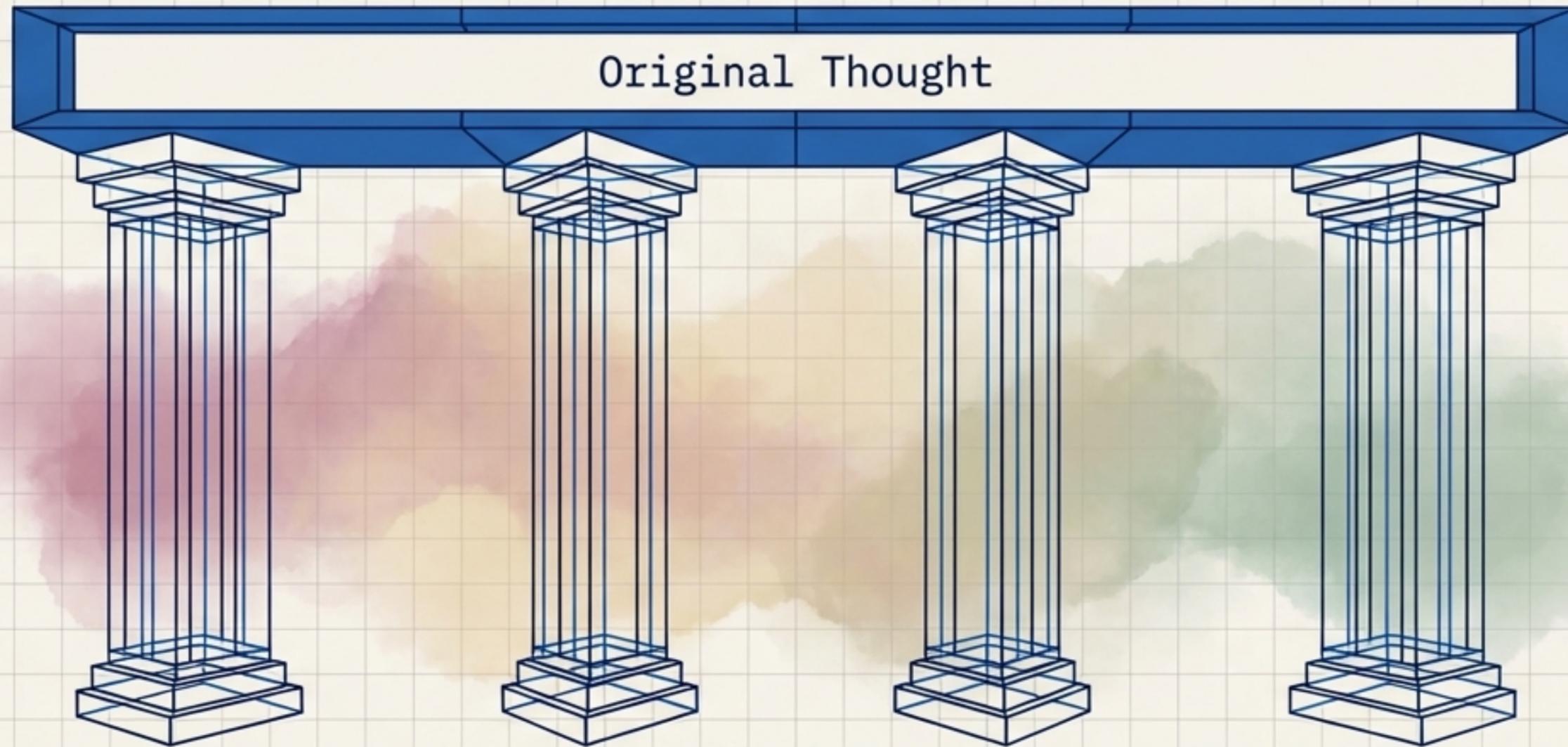
AI Reasons by Pattern.

AI tells you what has worked before. It relies entirely on analogy and aggregated history.

Humans Reason by Principle.

First principles reasoning strips a problem to its base truths. It tells you what will work when nothing has been tried before.

The Four Pillars of Cognitive Teardown & Rebuild

Original Thought

1. Defend the Opposite

Decoupling from conventional wisdom

2. The Blank Page Derivation

Engineering a novel solution

3. The Assumption Autopsy

Exposing invisible logic

4. Rebuild Under Constraints

The ultimate stress test

NotebookLM

Pillar 1: Defend the Opposite

The Goal

Not reflex disagreement, but the surgical identification of genuine conditions of failure.

The Constraint

Write a 500-word argument against a widely accepted best practice. Zero AI assistance allowed.

The Output

Identify at least 3 specific conditions where the accepted advice completely breaks down, derived entirely from base constraints.

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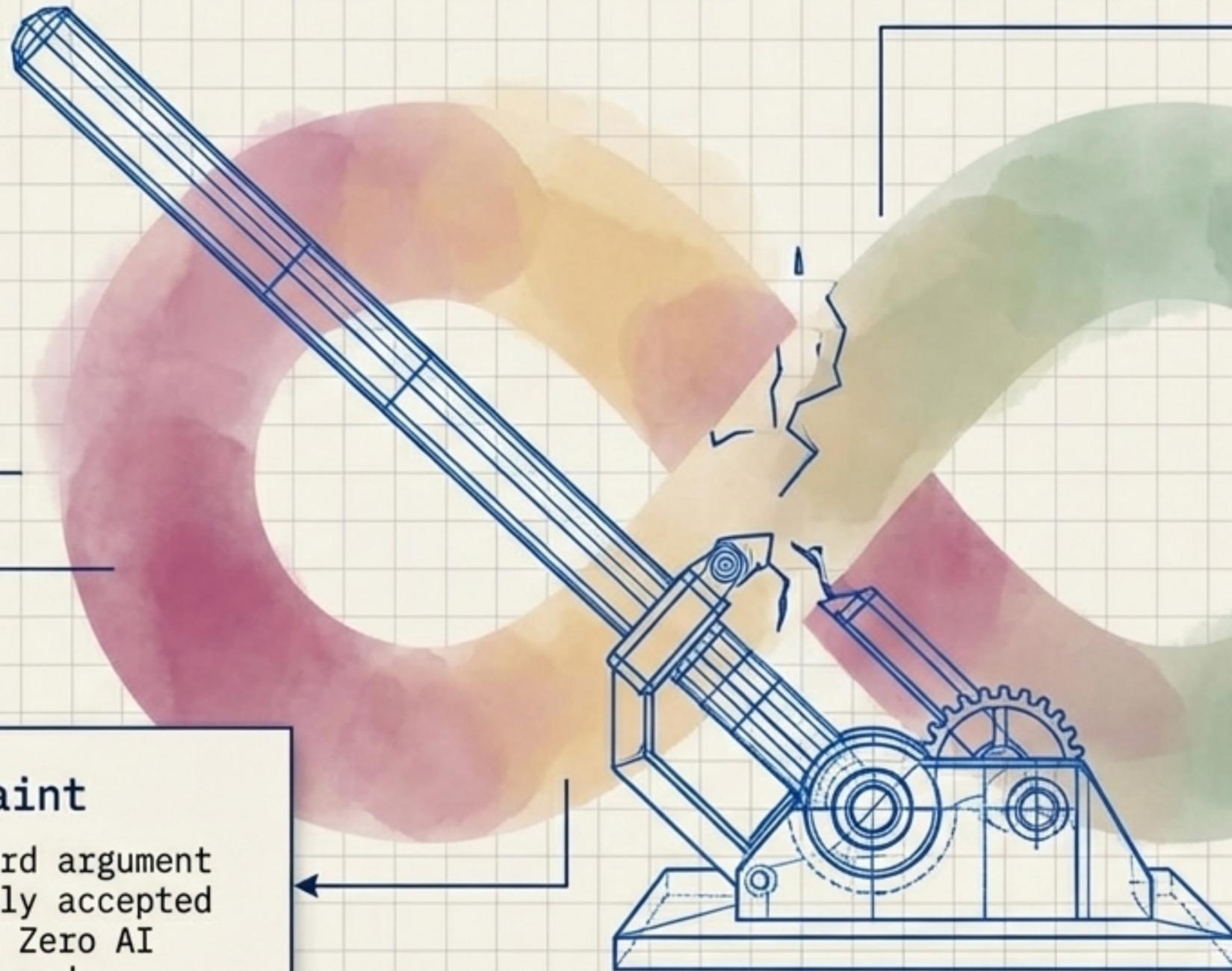
Diagnostic Matrix: Principles vs. Examples

Example-Based (Fragile)	Principle-Based (Robust)
Reasoning from counter-examples.	Reasoning from base constraints.
MVP fails because Company X launched one and lost their customers.	MVP fails when trust is a prerequisite, because incomplete products permanently signal unreliability.
Why it fails: It relies on circumstance, not underlying mechanics.	**Why it works:** It defines the exact structural conditions of failure.

Base Constraints

Explicit Assumptions
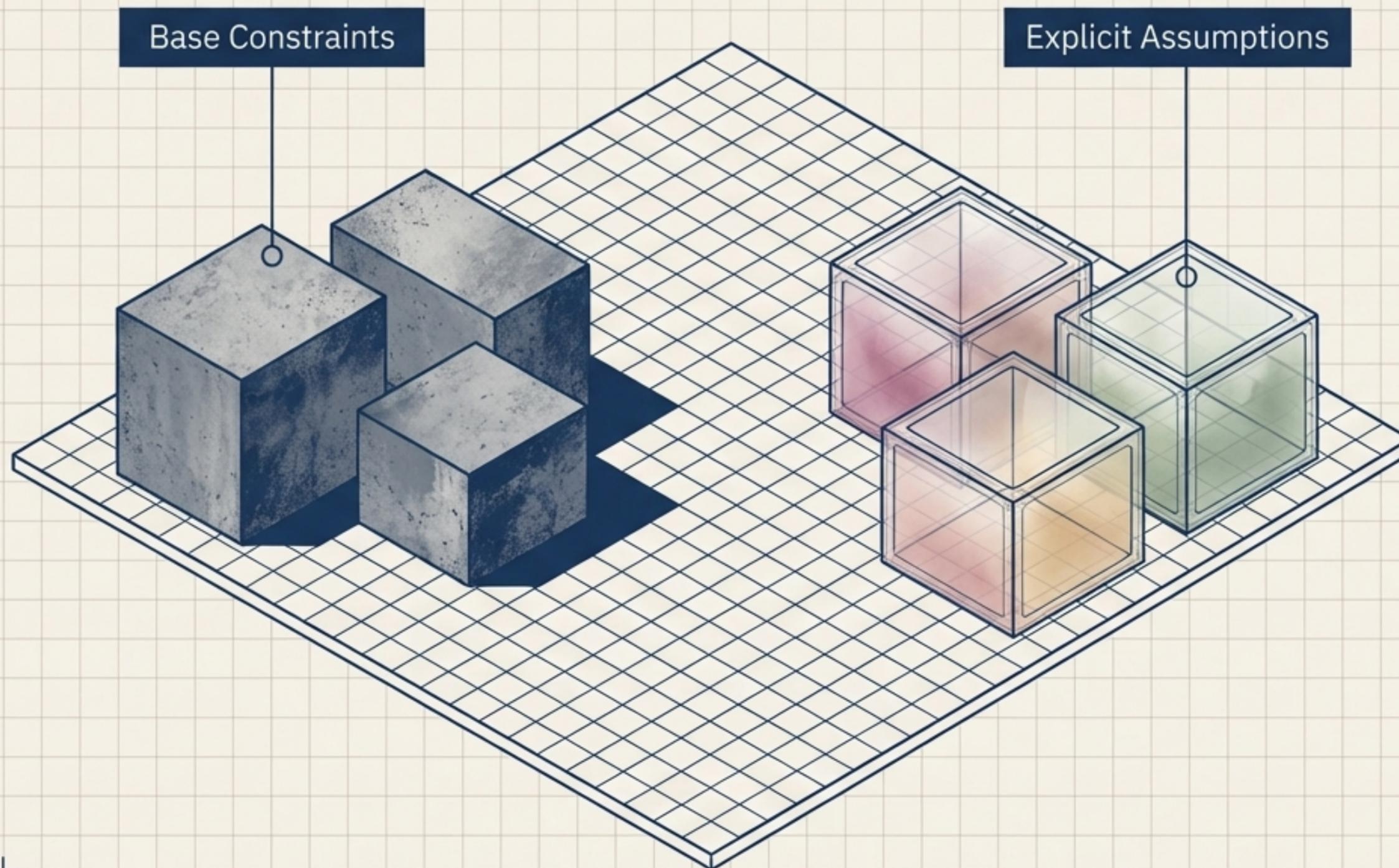
Pillar 2:
The Blank Page Derivation

Context

45 minutes. No AI. No internet. No established solutions to borrow.
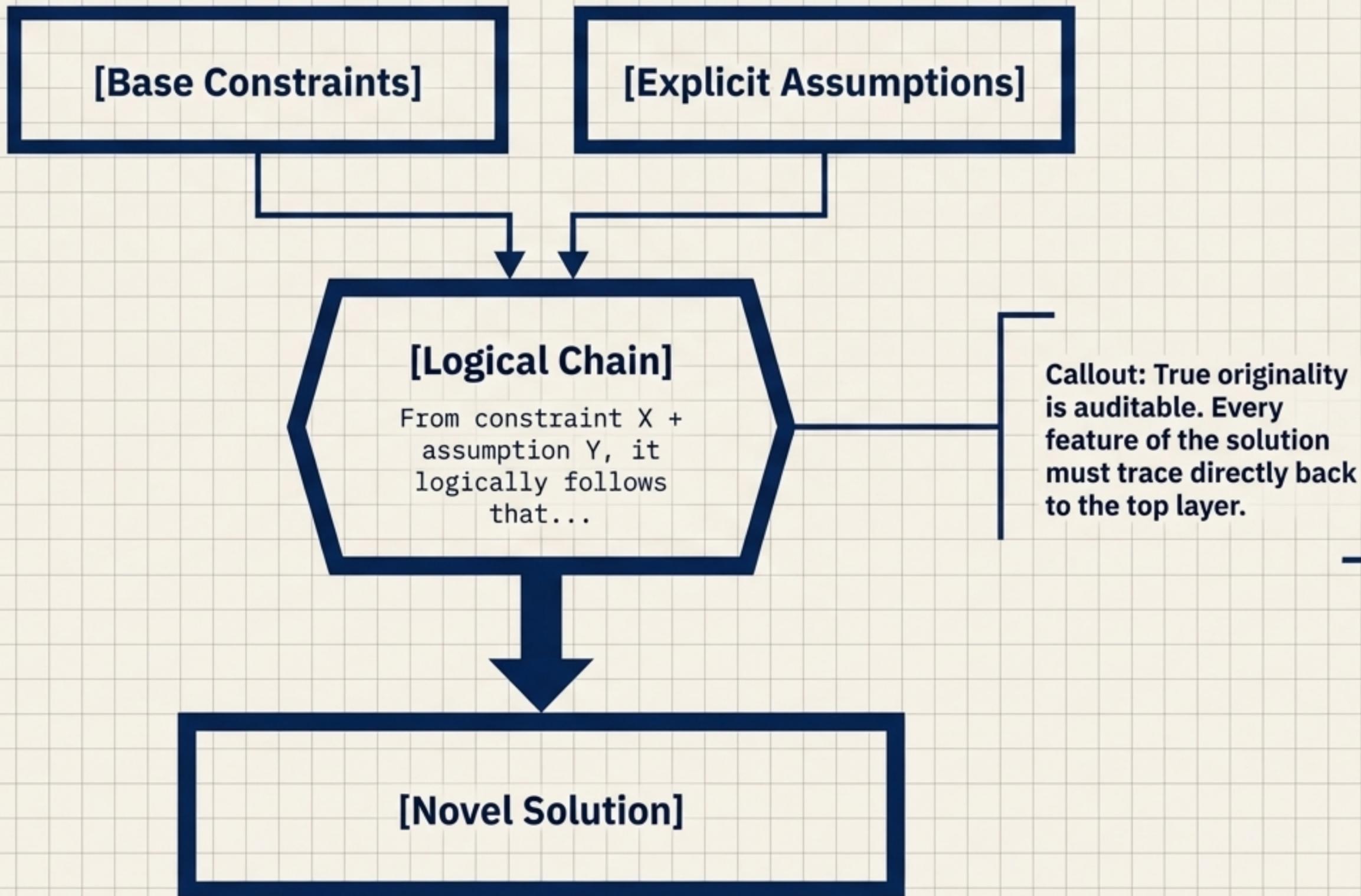
Base Constraints

The immutable truths of a problem. Facts that remain true regardless of the approach chosen (e.g., limited supply).

Explicit Assumptions

The variables and choices the solver introduces (e.g., equal access is the fairest distribution model).

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The Derivation Flowchart

[Base Constraints]

[Explicit Assumptions]

[Logical Chain]

From constraint X +
assumption Y, it
logically follows
that...

Callout: True originality
is auditable. Every
feature of the solution
must trace directly back
to the top layer.

[Novel Solution]

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The Divergence Test
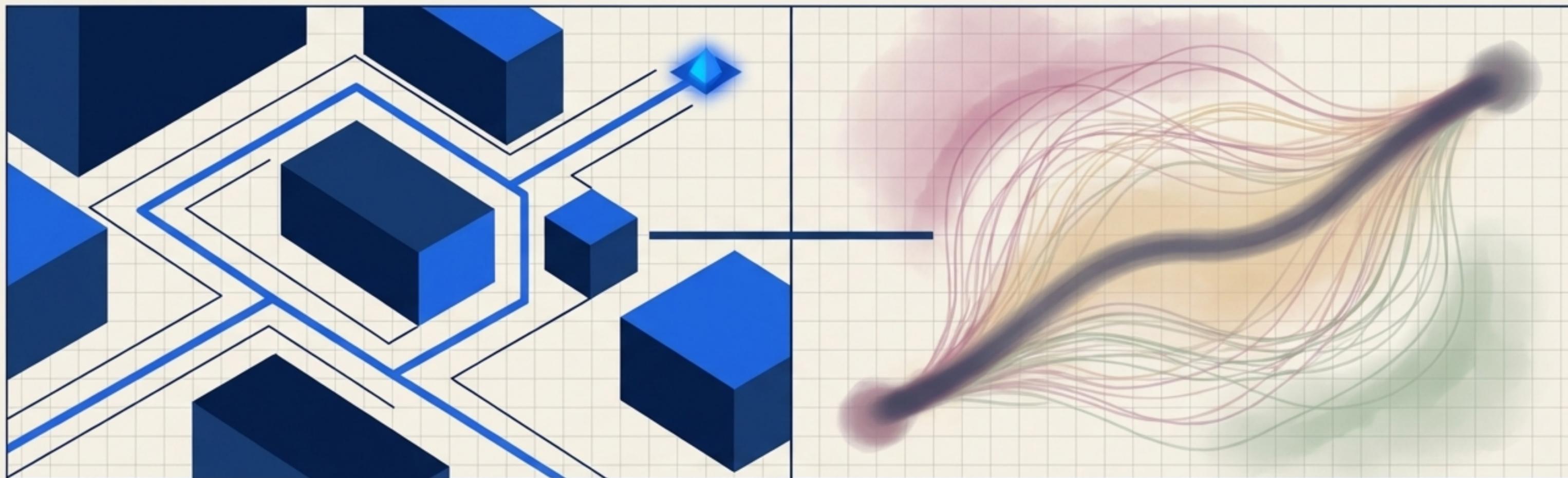
The Audit

Feed the same novel problem to AI and compare its output to your blank-page derivation.

The Insight

If your solution matches AI's perfectly, you unconsciously borrowed a familiar pattern. If it diverges, trace that divergence back to the specific constraint or assumption where your logic split from the aggregate average.

Pillar 3: The Assumption Autopsy

Core Concept

IBM Plex Mono Every solution is built on assumptions the solver did not know they were making. These are the invisible inputs of a causal chain.
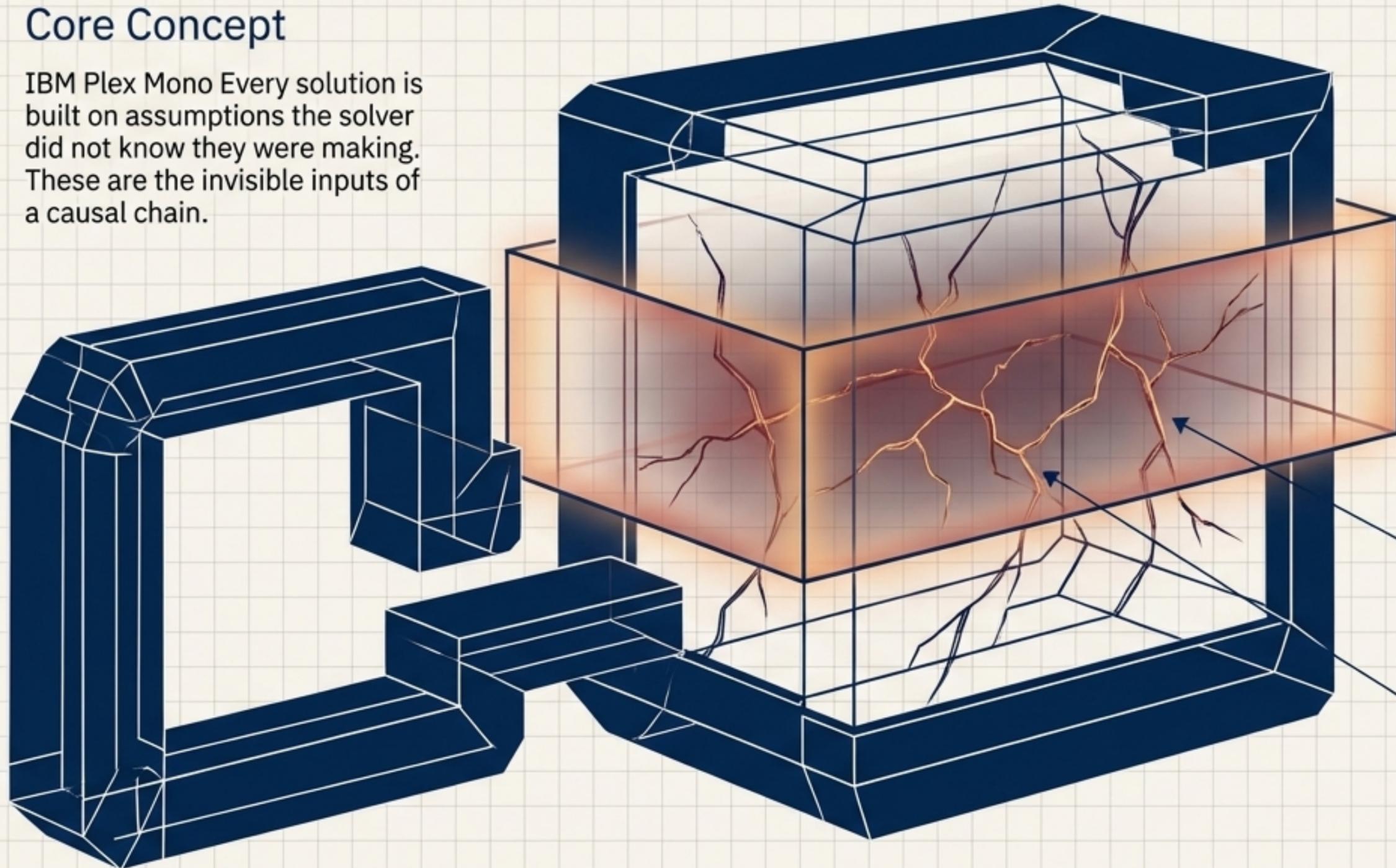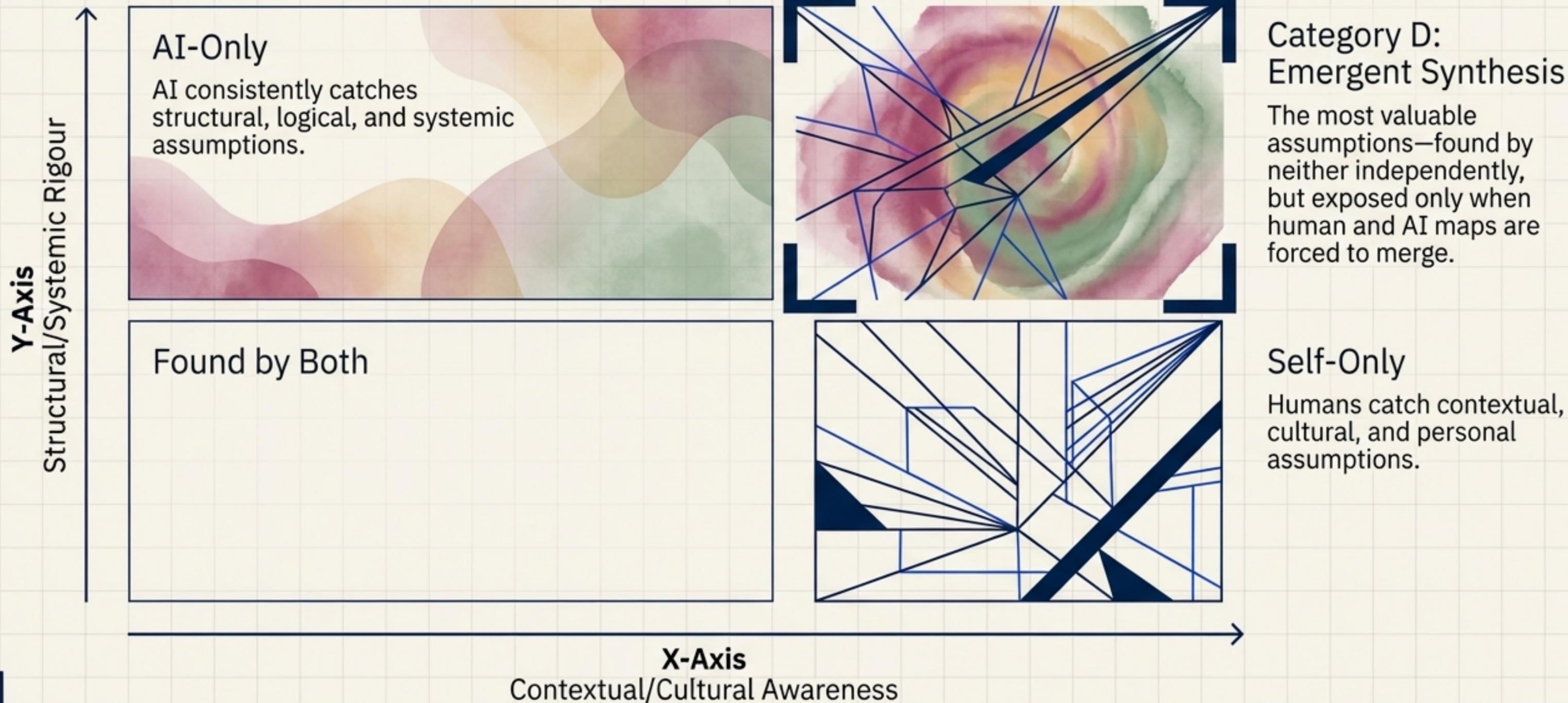
The Process

1. Systematically expand your assumption list independently.
2. Feed the solution to Claude and ChatGPT to identify the assumptions you missed.
3. Assess every hidden input as Reasonable, Risky, or Requires Testing.
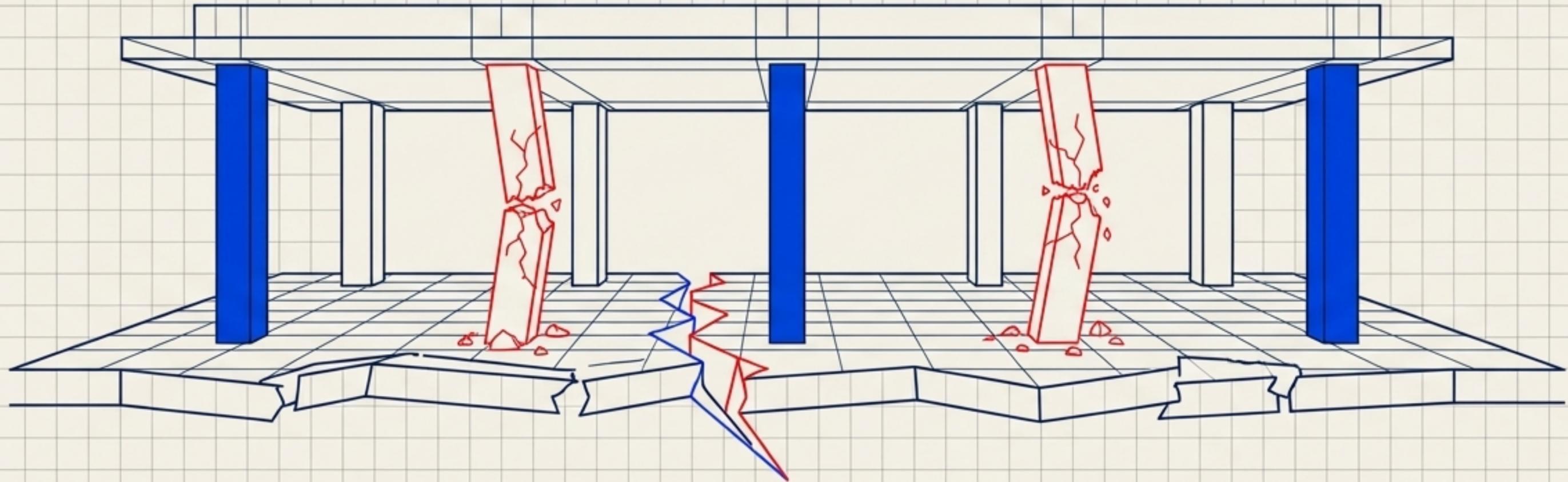
Hidden Assumptions: Unexamined causal links and biases.

Structural Vulnerabilities: Points of potential failure.

The Complementary Blind Spot Matrix

Y-Axis
Structural/Systemic Rigour

AI-Only
AI consistently catches structural, logical, and systemic assumptions.

Found by Both

Category D: Emergent Synthesis
The most valuable assumptions—found by neither independently, but exposed only when human and AI maps are forced to merge.

Self-Only
Humans catch contextual, cultural, and personal assumptions.

X-Axis
Contextual/Cultural Awareness

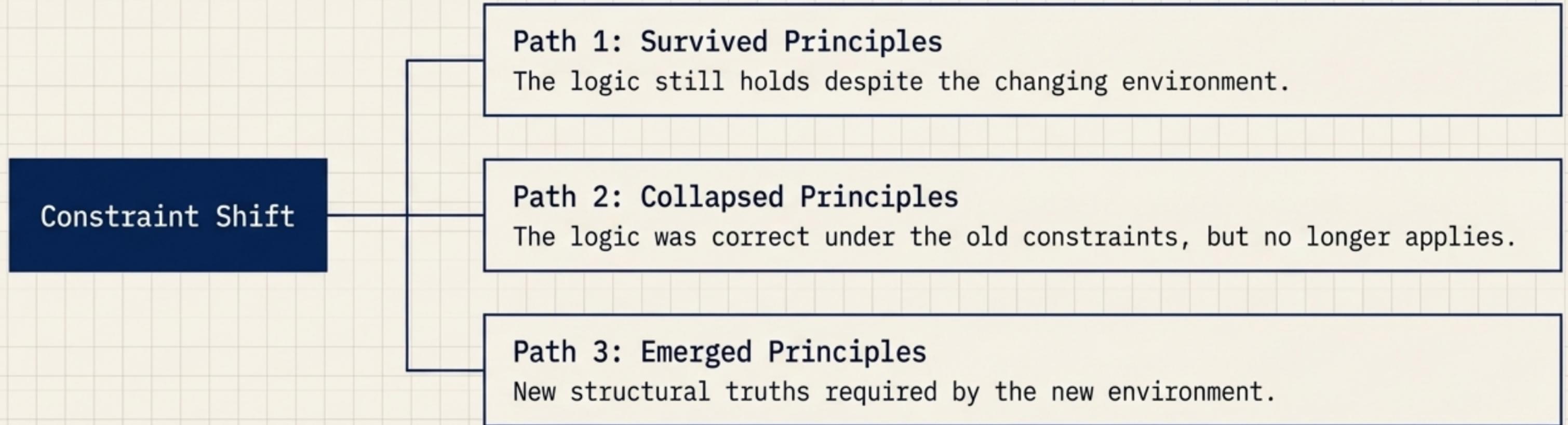NotebookLM

Pillar 4: Rebuilding Under Constraints

The Scenario

The environment shifts. A foundational constraint is fundamentally altered (e.g., moving from a state of limited supply to limited access).

The Challenge

You cannot start from scratch. You must trace the impact of the new constraint through your existing architecture to see what breaks and what holds.

The Principle Audit Mechanism

Constraint Shift

Path 1: Survived Principles
The logic still holds despite the changing environment.

Path 2: Collapsed Principles
The logic was correct under the old constraints, but no longer applies.

Path 3: Emerged Principles
New structural truths required by the new environment.

The Insight
AI adapts by throwing away the past and regenerating from scratch. Humans adapt by preserving core logic and rebuilding from surviving principles.
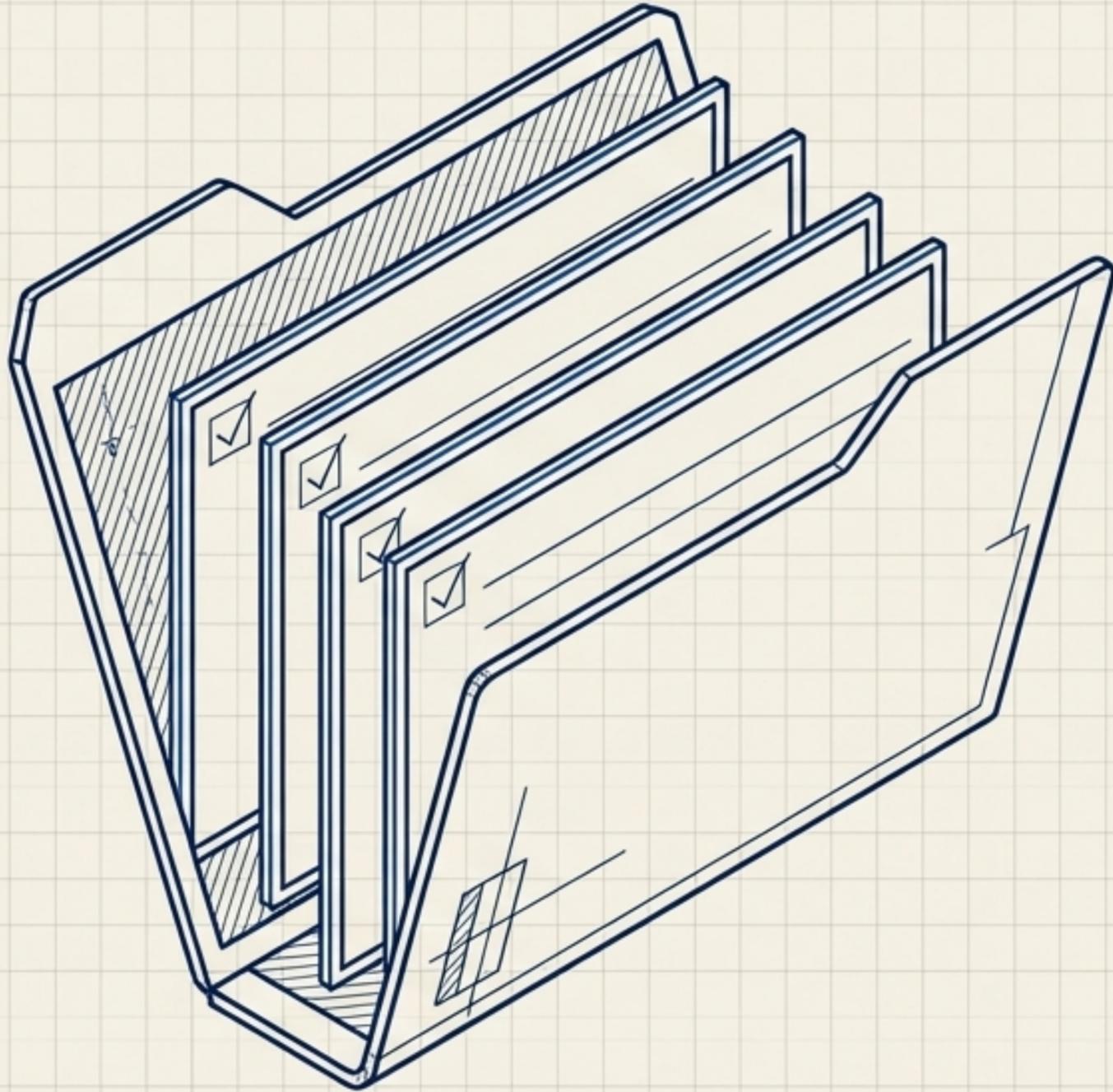
The Meta-Skill of the AI Era

AI provides the map of the known world. It aggregates every pattern, analogy, and best practice ever attempted.

First principles reasoning provides the compass. It is the only tool that allows you to navigate off the edge of the map and engineer solutions where patterns no longer apply.

The First Principles Portfolio

Item 1: The Contrarian Argument
A 500-word analysis of best-practice failure conditions, derived without AI.

Item 2: The Derivation Worksheet
A documented logic chain from base constraints to a novel solution, audited against AI divergence.

Item 3: The Merged Assumption Map
A categorised matrix of human contextual and AI structural blind spots.

Item 4: The Rebuild Audit
A stress-tested solution proving which principles survived a fundamental constraint shift.