# EPISTEMIC HUMILITY VALIDATOR v3.1

Gödel-Turing Constraint Layer

TIER 1 — FOUNDATION

Codename: The Intellectual Humility Engine

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| **Classification** | TIER 1 — FOUNDATION |
| **Codename** | The Intellectual Humility Engine |
| **Version** | 3.1 (Polymath Enhanced) |
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| **AI Architect** | Claude (Polymath Mastermind Mode) |
| **Parent System** | CEREBRO v3.5 |
| **Release Date** | November 2025 |

# 1. MATHEMATICAL FOUNDATIONS

| Framework | Contribution |
|---|---|
| Gödel | Every consistent system has truths it cannot prove |
| Turing | Some problems are computationally undecidable |
| Bayes | All knowledge is probabilistic with intervals |
| Pearl | Correlation ≠ Causation — causal graphs required |
| Hofstadter | Self-reference creates strange loops |

# 2. THE 14 MATHEMATICAL CHECKS

| # | Check | Purpose |
|---|---|---|
| 1 | Completeness Claim | Catches impossible 'all/complete' claims |
| 2 | Self-Verification Loop | Identifies circular reasoning |
| 3 | Prediction Horizon | Calculates reliable forecast timeframes |
| 4 | Bayesian Quantifier | Replaces vague confidence with intervals |
| 5 | Causal Validator | Distinguishes correlation from causation |
| 6 | Evidence Grader | Applies FDA/EMA quality standards |
| 7 | Calibration Tester | Verifies confidence matches accuracy |
| 8 | Uncertainty Propagation | Tracks compounding uncertainties |
| 9 | Regulatory Auditor | Enforces compliance requirements |
| 10 | Ethical Quantifier | Models stakeholder impacts |
| 11 | Expiration Calculator | Flags outdated knowledge |
| 12 | Sample Size Validator | Ensures statistical validity |
| 13 | Model Specification | Detects overfitting |
| 14 | Meta-Epistemic Monitor | Validates the validator |

# 3. v3.1 POLYMATH ENHANCEMENTS

## Epistemic Debt Tracker

Quantifies accumulated uncertainty like technical debt. Four debt types: Assumption Debt (30%), Uncertainty Debt (25%), Validation Debt (25%), Expiration Debt (20%).

| EDI Score | Level | Action |
| --- | --- | --- |
| 0-10 | HEALTHY | Low epistemic risk |
| 11-25 | ELEVATED | Schedule debt reduction |
| 26-50 | HIGH | Immediate validation required |
| 51-100 | CRITICAL | Major decisions at risk |
| 100+ | CRISIS | Pause until debt reduced |

## Cross-Domain Inference Validator

Catches category errors when reasoning crosses domain boundaries. Detects Physics Envy, Biological Essentialism, Engineering Solutionism, Medical Model Misapplication, and Legal Formalism.

| CDTS Score | Verdict | Action |
| --- | --- | --- |
| 0.8-1.0 | VALID | Proceed with standard caveats |
| 0.6-0.8 | CONDITIONAL | Requires explicit justification |
| 0.4-0.6 | RISKY | High scrutiny required |
| 0.2-0.4 | SUSPECT | Probably invalid |
| 0.0-0.2 | INVALID | Category error - do not transfer |

# 4. IMPLEMENTATION STATUS (Nov 2025)

| Component | Effectiveness | Notes |
| --- | --- | --- |
| Completeness Detection | 90% | Pattern matching works well |
| Evidence Grading | 75% | Standards documented |
| Epistemic Expiration | 85% | Half-lives calculable |
| Epistemic Debt Tracker | 75% | Framework clear |
| Cross-Domain Validator | 70% | Domain reasoning works |
| Bayesian Quantification | 65% | Qualitative only |
| Causal Inference | 60% | No statistical testing |

# 5. USAGE SYNTAX

## EPISTEMIC HUMILITY VALIDATE:

Claim: [The claim] | Domain: [Field] | Stakes: [HIGH/MEDIUM/LOW]

14 checks. Gödel-Turing constraints. Know the limits of what you know.