Ontology of the Simulated Universe v0.7

Toward a Quantitative Ethics Field Theory

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# 1. Overview

Version 0.7 advances the Ontology of the Simulated Universe into a formal quantitative framework, integrating critiques from v0.6 to establish a rigorous mathematical foundation for the moral–informational gradient (𝓜(t)). This iteration derives parameters from information geometry, upgrades proxy ethics with bias‑corrected data, and separates empirical and speculative layers in the quantum model. The objective is to move from a metaphysical ontology to a testable, interdisciplinary ‘quantitative ethics field theory.’

# 2. Parameter Derivations from Information Geometry

Following the free‑energy principle (F = kT Dₖₗ(Q‖P)), we define weights for moral entropy components as gradients of information divergence:  
  
wᵢ = ∂F/∂σᵢ = kT ∂/∂σᵢ [Dₖₗ(Q‖P)] with Σ wᵢ = 1.  
  
This derives regional weights directly from measurable divergence between expected (P) and empirical (Q) distributions, eliminating heuristic assumptions. The moral‑stability functional becomes:  
  
𝓜(t) = E[ κ(t) / (Σ wᵢ σᵢ(t) + ε) × ρ(t) × φ(t) ] ± √Var(κ, σ, ρ, φ).

# 3. Ethical Proxy Upgrades and Bias Correction

To correct reductive metrics like DALYs or Gini coefficients, multidimensional proxies are introduced:  
• σ₁ – Conflict Density (UCDP/PRIO)  
• σ₂ – Subjective Well‑Being (World Happiness Report)  
• σ₃ – Resource Inequality (World Inequality Database)  
  
Weights are derived via Shannon entropy balancing:  
wᵢ = Hᵢ / Σ Hᵢ, where Hᵢ = –Σ p log p for dataset i.  
  
A bias‑detection script (validation/corr\_audit.ipynb) flags correlation < 0.5 among proxies as potential ethical divergence.

# 4. Falsifiability Criteria and Statistical Justification

Empirical tests target cross‑domain moral coherence:  
  
1. corr(ρ\_{t−10:t}, −Δσ\_{t:t+20}) ≥ 0.35 (baseline = weak coupling threshold in sociophysics)  
2. |α\_emp − α\_pred| ≤ 0.3 (for stability scaling across domains)  
3. Var(𝓜(t)) non‑divergent over centuries (sign of bounded moral field)  
  
All thresholds are derived from bootstrap variance in empirical baselines (p < 0.05), making falsifiers statistically justified.

# 5. Two‑Layer Quantum–Ethical Integration

Layer 1 (Empirical): Ethics as stability constraint within informational thermodynamics:  
J = –μ (dQ/dt) subject to (dσ/dt ≤ 0).  
  
Layer 2 (Speculative): Quantum coherence as meta‑ethical driver:  
Φ(s) = g(N(ρ\_AB), I\_coh(s)) only if N(ρ\_AB) > N\_min.  
  
This maintains conceptual continuity with v0.6’s quantum coupling (Φ, Ω) while clearly labeling the speculative layer.

# 6. Implementation Ecosystem

The GitHub repository expands to support empirical modeling and simulation reproducibility:  
  
Quantum‑Entangled‑Ontology‑v0.7/  
│  
├── /data/ ( happiness\_index.csv, conflict\_density.csv )  
├── /models/ ( moral\_gradient\_sim.py, quantum\_coupling.py )  
├── /validation/ ( corr\_tests.ipynb, bias\_detection.ipynb )  
├── /docs/ ( Ontology\_v0.7\_Formalization.docx, README.md )  
  
These enable empirical reproducibility, community collaboration, and direct extensions into AI‑ethics simulations.

# 7. Roadmap Toward v0.8

• Derive μ and β from coherence entropy via symbolic modeling (SymPy)  
• Integrate real datasets from UCDP and World Happiness Report for parameter calibration  
• Run Monte‑Carlo tests for 𝓜(t) stability and Φ activation thresholds in QuTiP  
• Publish empirical results with transparent falsifiers ( pre‑registered on OSF )  
  
This roadmap ensures empirical maturation beyond speculative reasoning, moving toward testable moral field dynamics.

# 8. Citation

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GitHub: https://github.com/joshdotexe/Quantum‑Entangled‑Ontology‑The‑Ontology‑of‑the‑Simulated‑Universe‑v0.5‑2025‑

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