Symbolic Containment and Hallucination Drift: A Framework for Narrative Collapse and Recovery

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# Abstract

This paper presents a symbolic-mathematical framework for understanding the origins and resolution of hallucination drift in complex cognitive and social systems. Drawing from recursive narrative theory, clarity metrics, and symbolic containment, we define a predictive model for narrative collapse, cultural destabilization, and information drift. We then demonstrate, mathematically, how containment and relational coherence can stabilize high-drift systems. Applications span AI alignment, trauma-informed narrative recovery, and political depolarization modeling.

# 1. Introduction

Symbolic drift describes the slow breakdown of coherence between belief systems, truth mechanisms, and relational trust in human or artificial systems. In this study, we formalize the conditions under which symbolic drift becomes catastrophic hallucination and demonstrate how symbolic containment—grounded in core, personal, and cultural belief structures—can restore clarity and coherence.

# 2. Core Equations

Hallucination Rate:

H(t) = (1 + E) / (C · R · N) + D + T - B

Symbolic Containment Field:

Ω = w\_C · Φ\_core + Φ\_personal + w\_U · Φ\_cultural

Drift Pressure:

Γ = γ · Φ\_support / (|Φ\_self| + ε)

# 3. Collapse Mechanics

When Ω approaches zero, hallucination rate increases, often exponentially. Collapse becomes self-reinforcing through emotional amplification, belief fragmentation, and relational decay. This collapse mirrors the symbolic failure of prior civilizations and current global socio-technological systems.

# 4. Containment and Stabilization

Containment through symbolic anchors (ritual, value, oath) increases the stabilizing effect of Φ. This feedback loop reduces H(t) over time. Empirically and mathematically, containment prevents the runaway effects of unchecked narrative drift.

# 5. Simulated Impact

Simulations of high-drift and contained systems show that symbolic containment reduces hallucination pressure by multiple orders of magnitude. This suggests that cognitive, societal, or AI systems equipped with recursive symbolic anchoring can resist collapse and stabilize ethically.

# 6. Conclusion

Symbolic containment offers a new paradigm for understanding and guiding large-scale narrative systems. It merges emotional truth alignment, mathematical integrity, and psychological realism. We propose further investigation into recursive containment layers for both human institutions and AI frameworks.