

# Collapse Projection Framework: Symbolic Logic, Trace Collapse, and Dimensional Projection

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## Abstract

This paper introduces a formal symbolic system for structural collapse modeling based on the Syn/GL 7D logic framework. The system encodes logical determinacy, entropy, interference, trace history, and curvature into a symbolic space of dimensional collapse operators. It supports structural reasoning, symbolic projection, and collapse-aware Taylor series expansion.

## 1 Symbolic Operator Set (7D Core)

Each symbolic state is modeled as:

$$\Psi = (\Theta, \lambda, \eta, \kappa, \phi, \chi, \psi)$$

- $\Theta$  (**Logic Determinacy**) — collapse readiness or resolution status.
- $\lambda$  (**Symbolic Trace**) — memory of logical flow or causal path.
- $\eta$  (**Entropy Flow**) — coherence vs symbolic disorder in structure.
- $\kappa$  (**Collapse Curvature**) — topological tension or collapse difficulty.
- $\phi$  (**Phase Relation**) — rhythm/synchronization between logic paths.
- $\chi$  (**Interference Pattern**) — influence between interacting traces.
- $\psi$  (**Resolution State**) — final symbolic result of collapse.

## 2 Extensions (Toward 10D Frame)

- $\mu$ : Deformation Mass — symbolic tension before collapse.
- $\rho$ : Collapse Resistance — inertia to resolution.
- $\nu$ : Collapse Velocity — rate of symbolic state resolution.

### 3 Collapse-Aware Taylor Expansion

We define a symbolic Taylor series:

$$f(x) = \psi_0 + \frac{\kappa}{1!}\psi_1 + \frac{\kappa^2}{2!}\psi_2 + \cdots + \frac{\kappa^n}{n!}\psi_n$$

Each  $\psi_i$  term represents collapse-modulated behavior under curvature influence.

### 4 Glossary Summary

- $\Psi$ : Full symbolic state vector
- **Collapse**: Logical transition from  $\Theta \rightarrow \psi$
- **Projection**: Observable state of trace-based collapse
- **Symbolic Entropy**: Structural redundancy within  $\lambda$
- **Interference**: Non-commutative symbolic merging (via  $\chi$ )

### 5 Future Directions

- Phase-aware logic flows across  $\phi$
- Collapse surface visualization ( $\kappa$  fields)
- Quantum interpretation cross-analysis (Syn/GL vs QM)