Adaptive/Dynamic Reasoning (ADR):

A Minimal Loop Model for Sustained Premise Regeneration

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Abstract

This paper introduces Adaptive/Dynamic Reasoning (ADR), a minimal loop structure that enables sustained regeneration of premise states. The model is defined by three relations: (i) discrepancy Δ is generated from unknown regions, (ii) premises are regenerated according to Δ, and (iii) regenerated premises can alter unknown regions and induce new Δ. Through this loop, the rate of premise redefinition dP/dt remains active. ADR explains how cognitive updating persists as a sustained process.

1. Introduction

Paper 1 defined the structural organization of premises (CPF), and Paper 2 formalized cognition as the rate of premise regeneration dP/dt. This paper presents ADR, a loop model explaining how regeneration persists rather than terminating after a single update.

2. Fundamental Relations of ADR

Discrepancy generation:

$\Delta = h(\nabla P\_unknown)$

Premise regeneration:

$P = g(P\_prev, \Delta)$

Cognitive updating:

Cognition = dP/dt

These components form a closed interaction loop.

3. The ADR Loop

1. Variation in unknown regions produces Δ.

2. Δ induces regeneration of the premise state.

3. The regenerated premise modifies unknown regions.

4. The modification produces new Δ.

As long as $\Delta \neq 0$, premise redefinition continues.

4. Characteristics of ADR

• Discrepancy-dependent updating

• Metastability

• Cyclic structure enabling sustained activity

5. Interpretation

ADR frames reasoning as a sustained sequence of premise redefinitions driven by discrepancy.

6. Position within the Framework

• Paper 1 (CPF): structure

• Paper 2 (dP/dt): transformation

• Paper 3 (ADR): persistence

7. Conclusion

ADR explains continuous cognitive activity via a minimal discrepancy–regeneration loop.