Godframe Theory – Simulation Test Log

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# Summary

This document contains a detailed log of simulation tests performed on the Godframe Theory, including activation dynamics, scalar field behavior, cosmological implications, and gravitational feedback. The following tests were run and validated step-by-step using coupled equations and numerical integration methods. Each test corresponds to a core domain of the theory: origin, inflation, dark matter, and black hole edge physics.

## Test 1: Scalar Field Activation (Ξ < Ξ\_c)

We simulated a 1D scalar field φ(t) under the condition where the relativistic activation invariant Ξ does not exceed the critical threshold Ξ\_c = c⁵/G. The field remained dormant, confirming the activation kernel properly suppresses evolution below threshold.

## Test 2: Friedmann Evolution with φ\_s as Dark Matter

We replaced CDM with φ\_s (frozen scalar residue) in the Friedmann equation. The resulting H(z) matched ΛCDM exactly, confirming that φ\_s behaves as pressureless matter (ρ ∝ a⁻³).

## Test 3: Static Scalar Field Near Black Hole Horizon

We modeled φ(r) with activation tied to Ξ(r) ≈ γ(r)·(m²c³/ħ), where γ diverges near r\_s. φ activated near the horizon and altered the curvature via the stress-energy tensor. Metric component A(r) steepened near r\_s.

## Test 3A: Coupled Einstein–Scalar System

We numerically solved the static Einstein–Klein-Gordon system in spherical symmetry. Activation of φ near r = 1 caused curvature feedback. A(r) showed non-Schwarzschild deformation due to scalar energy.

## Phase 1 & 2: Flashpoint and Expansion

In FLRW cosmology, φ(t) activated as Ξ(t) rose past Ξ\_c. This caused a rapid rise in the scale factor a(t), demonstrating self-initiated inflation. φ later deactivated smoothly.

## Phase 3: Echo Field Formation

After Ξ dropped below Ξ\_c, φ froze at φ\_s. The derived ρ\_s ∝ φ\_s² a⁻³ showed cold dark matter behavior. This confirmed the scalar field leaves behind a non-decaying, gravitationally active residue.

## Phase 4: Black Hole Edge Reactivation

Ξ(r) again diverged near the event horizon. φ(r) became active only in the near-horizon shell. The resulting A(r) metric steepened, indicating new gravitational behavior not predicted by pure GR.