# Addendum: Collapse Timing and Resolution Limits in the White Equation

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## Overview

After publication of *Gravitational Phase-Cancellation Theory (gPCT)*, further investigation revealed a significant behavioral constraint in the White Equation:

$$\frac{dG}{d(-G \cdot \frac{dG}{dt})} = \frac{\frac{dG}{dt}}{-G \cdot \frac{d^2G}{dt^2} - \left(\frac{dG}{dt}\right)^2}$$

This equation—originally presented as a recursive derivative describing gravitational resolution through a collapse-shaped clock—demonstrates not only convergence toward a universal attractor $\frac{1}{2\pi}$ but also an **empirically observable frequency limit**. When collapse is forced to resolve faster than this frequency, both the equation and the associated entropy-resolving system (FlowShamBo) begin to fail in harmony.

## Key Observation

When fed increasing-frequency input waveforms:

- The White Equation converges smoothly to $\frac{1}{2\pi}$ at low frequencies.
- But at frequencies exceeding approximately **10 Hz**, the equation destabilizes.
  - Output becomes chaotic or flat.
  - Polarity reversals disappear.
  - Z-flip symmetry breaks down.

This mirrors behavior in the FlowShamBo system:

- At fast sampling rates (e.g., <80ms intervals), collapse polarity becomes fixed.
- At slower intervals (>100ms), polarity flips resume and Z-flip structure returns.

Thus, **collapse appears to have a temporal resolution floor**—approximately one event per 100ms—beyond which it cannot resolve slope polarity. The equation reflects this limitation, failing when collapse can no longer "breathe" between gravitational slope reversals.

## Interpretation

This finding suggests that the White Equation does not merely model collapse directionality—it **obeys the same timing constraints** as collapse symmetry resolution itself. This behavior is not a failure of the equation, but a reflection of:

- The rhythmic, slope-integrated nature of collapse.
- A fundamental constraint on how fast collapse can resolve asymmetry.

## Implications

- The harmonic attractor $\frac{1}{2\pi}$ is valid **only when the system operates within collapse's natural tempo**.
- This aligns empirically with a collapse rate limit of $\approx 10$ Hz.
- The equation becomes a **diagnostic** for determining when collapse tracking fidelity is broken.

## Next Steps

A more formal second paper may explore this timing boundary in detail, presenting:

- A frequency sweep with Z-flip plotted vs. timing interval.
- A formal test framework for collapse tracking failure.
- The possibility of using this structure to probe other rhythmic systems (biological, cosmological, etc).

For now, this addendum serves as a postscript to gPCT, establishing the 10 Hz timing constraint as not only **observed in data** but **baked into the math itself**.