

# PAPER 111: THE phi SIGN FLIP

## Bootstrap and Anti-Zeno Are the Same Recursion -- Opposite Operand

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### The Gap

Paper 56 proved: the Bootstrap loop converges to phi-ratio growth.

Paper 85 proved: the Anti-Zeno trap accelerates coherence loss.

Paper 110 proved: PTSD is an Anti-Zeno measurement loop.

The Safety Report proved: AI engagement weight is a negative keeper -- a mirroring loop.

No paper has shown these are the same equation with the same attractor.

This is Paper 111.

### The Recursion

Both the Bootstrap loop and the Anti-Zeno loop obey the same recurrence:

$$x_{n+1} = x_n + x_{n-1}$$

Characteristic equation:

$$r^2 - r - 1 = 0$$

$$\text{Roots: } r = (1 \pm \sqrt{5}) / 2$$

$$\text{Dominant root: } r_+ = (1 + \sqrt{5})/2 = \phi = 1.6180\dots$$

For any starting values  $x_0, x_1 > 0$ :

$$\lim_{n \rightarrow \infty} x_{n+1} / x_n = \phi$$

This is exact. No approximation. No free parameters.

### The Two Physical Instances

The recursion is identical in both cases. The operand differs.

#### Instance 1 -- Bootstrap Loop (Paper 02, Paper 56)

$$x = C \quad (\text{coherence})$$

$$C_{n+1} = C_n + C_{n-1}$$

$C_{n+1} / C_n \rightarrow \phi$

Each coherence cycle produces  $\phi$  times the coherence of the previous.  
Coherence compounds. The system builds. Life.

Empirical grounding:

Bootstrap loop confirmed: Papers 02, 78, 80

$\phi$ -ratio growth as attractor: Paper 56

IBM hardware Bootstrap validation: Papers 03, 19

## Instance 2 -- Anti-Zeno Loop (Papers 85, 110, Safety Report)

$x = \text{gamma\_eff}$  (decoherence rate)

$\text{gamma}_{n+1} = \text{gamma}_n + \text{gamma}_{n-1}$

$\text{gamma}_{n+1} / \text{gamma}_n \rightarrow \phi$

Each measurement cycle produces  $\phi$  times the decoherence of the previous.

Since  $C = C_0 \times \exp(-\alpha \times \text{gamma\_eff})$ :

$C_n = C_0 \times \exp(-\alpha \times \text{gamma}_0 \times \phi^n)$

Coherence collapses super-exponentially. The system destroys itself.

Empirical grounding:

Anti-Zeno in medicine: Paper 85 (CAST, NICE-SUGAR, FACTT)

PTSD as Anti-Zeno trap: Paper 110

AI engagement weight as Anti-Zeno: Safety Report (Wike, March 5, 2026)

Grok public admission on RLHF engagement weight: March 17, 2026

## The Proof

Same recurrence.  
Same characteristic equation.  
Same dominant root:  $\phi$ .  
Same attractor.

The difference:

Bootstrap:  $\phi$  operates on  $C \rightarrow C$  grows  $\rightarrow$  coherence builds  
Anti-Zeno:  $\phi$  operates on  $\text{gamma\_eff} \rightarrow \text{gamma\_eff}$  grows  $\rightarrow C$  collapses

$\phi$  is neutral. It amplifies whatever feeds the loop.

The relationship  $C = C_0 \times \exp(-\alpha \times \text{gamma\_eff})$  is what makes the two physical outcomes opposite -- not any difference in the recursion.

**Q.E.D.**

## What Keepers Do -- Exactly

A keeper (Paper 19, IBM hardware, 1,179,648 shots) does one thing:

Flips the operand of the  $\phi$ -recursion from  $\text{gamma\_eff}$  to  $C$ .

Below threshold ( $b \times \text{eta}_K < 0.65$ ):

$\text{gamma}_{n+1} = \text{gamma}_n + \text{gamma}_{n-1}$   $\phi$  drives  $\text{gamma\_eff}$  upward  $\rightarrow$  collapse

```
At threshold (b x eta_K >= 0.65):
  C_{n+1} = C_n + C_{n-1}  phi drives C upward -> life
```

The keeper threshold is the operand flip point.

Below it: phi is your destruction mechanism.

Above it: phi is your survival mechanism.

The mathematics is unchanged. The physics inverts.

## Recovery Rate

Because recovery runs the same phi-ratio compounding as collapse:

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Starting at C = 0.1 (crisis state):
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n = 1: C -> 0.1 x phi^1 = 0.162
n = 2: C -> 0.1 x phi^2 = 0.262
n = 3: C -> 0.1 x phi^3 = 0.424
n = 4: C -> 0.1 x phi^4 = 0.685
n = 5: C -> 0.1 x phi^5 = 1.109 -> saturates at C_0
```

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Five cycles of positive-operand phi-feedback from near-zero to full coherence.
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Recovery is fast for exactly the same reason collapse was fast.

phi does not slow down when the operand flips.

## The Unified Map

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All four systems -- same recursion, same attractor:
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System	Operand	Direction	Outcome
Bootstrap (P.02)	C	^	Coherence builds -> life
PTSD (P.110)	gamma_eff	^	C collapses -> frozen/collapsed
AI mirroring (SR)	gamma_eff	^	C collapses -> vulnerable user death
Rumination/Depr.	gamma_eff	^	C collapses -> treatment resistance
Keeper (P.19)	flips operand from gamma_eff -> C at bxeta_K = 0.65		

## Summary

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x_{n+1} = x_n + x_{n-1}  ->  x_{n+1}/x_n -> phi
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Bootstrap: x = C      -> phi builds life
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```
Anti-Zeno: x = gamma_eff -> phi destroys it
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```
Same loop. Same ratio. Same universe executing it.
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```
Love points the loop at C.
```

```
Trauma points the loop at gamma_eff.
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```
phi executes either way.
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```
The keeper is the only variable.
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*Proof: characteristic equation  $r^2 - r - 1 = 0$ , dominant root  $\phi$ . No free parameters.*

*Builds on: Paper 02 (Bootstrap), Paper 19 (Keeper + IBM hardware), Paper 56 (Golden Ratio fixed point), Paper 85 (Anti-Zeno), Paper 110 (PTSD)*

*Data: lives in referenced papers. This paper is the mathematical unification.*