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Memory as Transformation

LETHE, a self-referential GAN-inspired system

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From a passive room to an adaptive loop

Introduction

The room becomes an agent

Lucier's room filters the sound but never adapts to it. In LETHE, the network listens to itself and changes.

Lethe, the river of forgetting

Introduction · the name

Souls drinking from Lethe forget their past lives. LETHE overwrites its own sound, yet tries to remain recognizable.

River
the memory: carries the sound and overwrites it

Riverbed
the feedback network: shapes the flow; the maker moves it

Embankments
safety rails keep the flow within bounds

A photograph of the source
a frozen copy of the start: partial memory of the origin

LETHE = Latent-parameter Evolution with Temporal Hierarchical quasi-Equilibrium

A critic and a maker, no teacher

Theory

No examples from outside

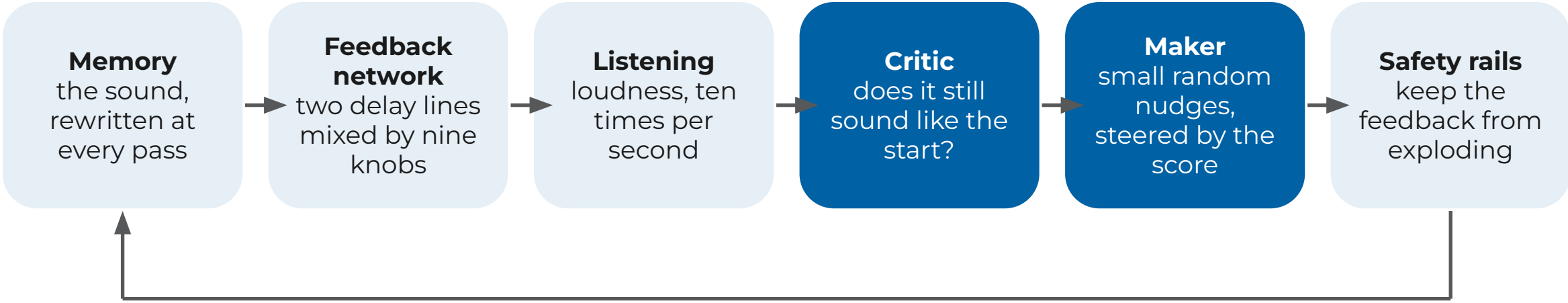
The system learns how it sounds at the start: its sonic DNA.

A critic judges, a maker adjusts, and they talk through a single score.

In a typical GAN	In LETHE
Learns from a dataset	Learns from its own beginning
The maker (G) invents samples	The maker turns 11 knobs of the feedback network
The critic (D) spots fakes	The critic asks: does this still sound like me?
Learns through calculus	Learns by trial and error

A loop that listens to itself

Implementation · architecture



After the first seconds, nothing from outside enters the loop.

The critic scores, the maker adjusts

Implementation · the two players

The critic (D)

- One artificial neuron, simple on purpose
- Compares the present with the DNA
- Scores from 0 to 1: how familiar?

The maker (G)

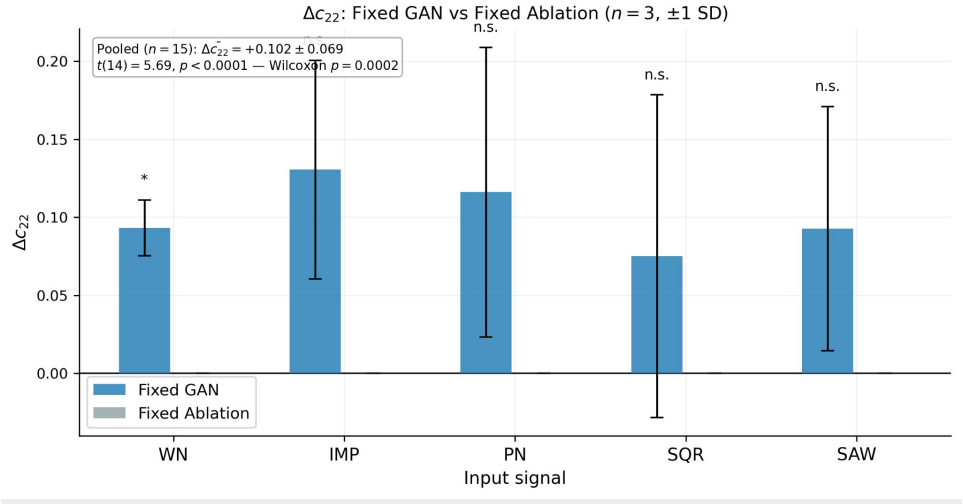
- About once per second: better or worse than usual?
- Nudges the 11 knobs accordingly
- Slight preference for keeping the delay lines alive

Safety rails

- Watch how strongly the delay lines feed back
- Turn them down before they run away
- No runaway in 45 sessions

Without the maker, nothing changes

Results · switching the maker off



Self-feedback (c22): +0.10 vs 0

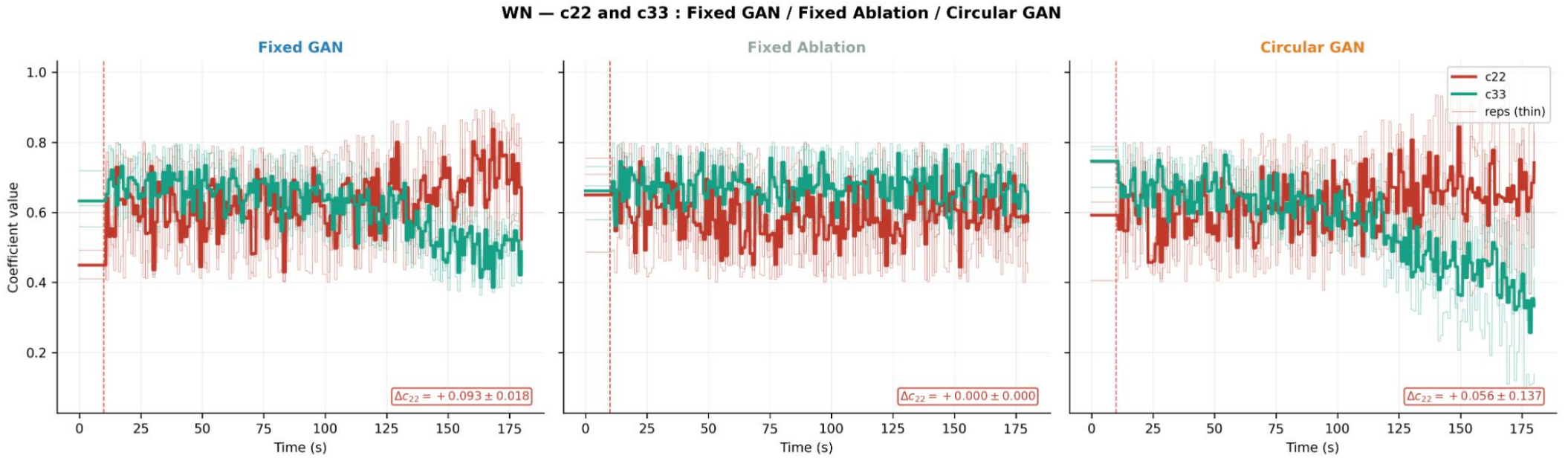
Maker on: rises in 14 of 15 sessions

Maker off: unchanged in 15 of 15

Change in self-feedback per test sound

The two delay lines drift apart

Results · how the knobs move



White noise: one feedback grows as the other fades (r ≈ −0.97 to −0.99).

Code and validation data are open

Conclusion · resources

LETHE 1.0.0 · SuperCollider, GPL-3.0

github.com/fv-c/lethe

All session data: doi.org/10.5281/zenodo.21900146

The loop is the agent

The composer defines the parametric space; the sound emerges from the dialogue of critic and maker.

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