if you did this for zero sum game then convergent game or vice versa ...."Train the coupled agents for some period (say 200 cycles).
Preserve the learned internal state:
Q-values,
policy weights,
opponent models,
temperature schedules,
memory buffers, etc.
Reset the external game state or interaction conditions.
Restart interaction.
Compare this against:
fully naive random initialization,
and possibly partially reset controls.

If the post-reset system behaves differently from a fresh initialization, then the dynamics are path dependent.

Yes — and cross-switching between zero-sum and convergent games could become a genuinely powerful experiment.

Because then you are no longer merely testing:

- “does memory exist?”

You are testing:

- whether different game topologies leave persistent latent structure in the learned state.

That is much deeper.

The key idea

Suppose you:

Case A

1. Train in RPS (rotational/adversarial)
2. Preserve internal state
3. Switch to Prisoner's Dilemma (convergent)

versus

Case B

1. Train in Prisoner's Dilemma
2. Preserve state
3. Switch to RPS

Then compare against fresh initialization.

Why this is interesting

If learning is merely:

- transient geometry,
- short-term oscillation,
- local relaxation,

then the prior game should not matter much after switching.

But if the internal state retains:

- latent attractor structure,
- exploration biases,
- phase relationships,
- opponent priors,
- adaptive memory,

then prior topology should shape future dynamics.

That would imply:

- learning geometry persists across environments.

Possible outcomes

1. No effect

Switch behaves identically to fresh initialization.

Interpretation:

- prior dynamics were mostly local transient relaxation,
- little retained adaptive structure.

This would weaken stronger claims in the manuscript.

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2. Faster adaptation

Example:

- RPS-trained agents adapt faster to new adversarial games.

Interpretation:

- rotational learning leaves reusable adaptive structure.

Interesting.

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3. Persistent oscillatory bias

Example:

- RPS-trained agents continue exhibiting cycling behavior even in convergent games.

This would be extremely interesting.

Because it would suggest:

- adversarial topology imprints metastable rotational priors into the learning system.

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4. Catastrophic mismatch

Example:

- convergent-trained agents collapse rapidly when exposed to RPS,
- or RPS-trained agents fail to stabilize in coordination games.

This would suggest:

- different game classes produce fundamentally incompatible adaptive geometries.

Also very interesting.

This starts resembling phase-space conditioning

The learned internal state becomes:

- a dynamical substrate shaped by prior environments.

Not just:

- local optimization memory.

That is much richer.

The really important conceptual question

Do adversarial systems generate:

- reusable adaptive flexibility,

or merely:

- persistent oscillation?

This experiment could help distinguish those.

Most interesting possibility

You hinted at something very deep earlier:

> rotational manifolds may store latent adaptive information.

Cross-game transfer is exactly how you would test that.

If:

- prior adversarial exposure changes future adaptive trajectories,
  then:

- the manifold is not merely geometric confinement,
- it contains historically conditioned structure.

That is a much stronger claim.

This would connect to several major ideas

Including:

- transfer learning,
- curriculum learning,
- hysteresis,
- evolutionary preadaptation,
- latent-space conditioning,
- attractor memory,
- meta-learning.

Important caveat

Even if this works, it still would not automatically imply:

- intelligence,
- semantic knowledge,
- cognition.

Physical systems can exhibit:

- hysteresis,
- memory,

- metastability,
- path dependence,
  without being intelligent.

But it *would* demonstrate:

- persistent adaptive structure beyond immediate transient relaxation.

That would already substantially deepen the manuscript.

Scientifically, this may be the best direction you've identified so far

Because it directly tests:

Does adversarial topology leave reusable dynamical structure?

That is:

- empirical,
- mechanistic,
- falsifiable,
- and genuinely interesting.

It is much stronger than:

- merely plotting entropy decline or PCA compression.