

# FOUNDATIONS OF MUSIC

A conceptual framework for understanding music as a dynamic system grounded in perception, structure, and transformation.



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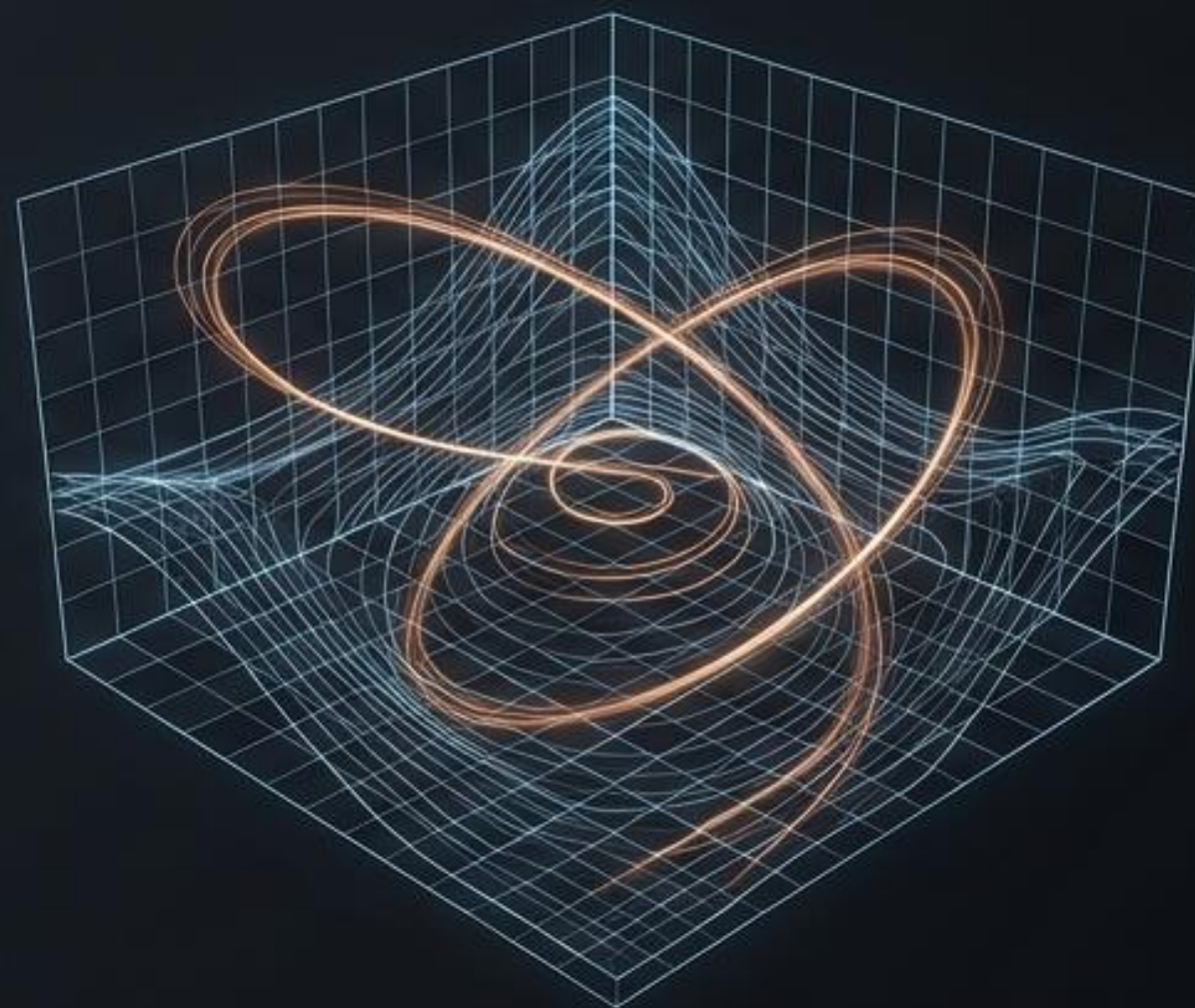
# Redefining the fundamental question of musical inquiry

## The Traditional Inquiry



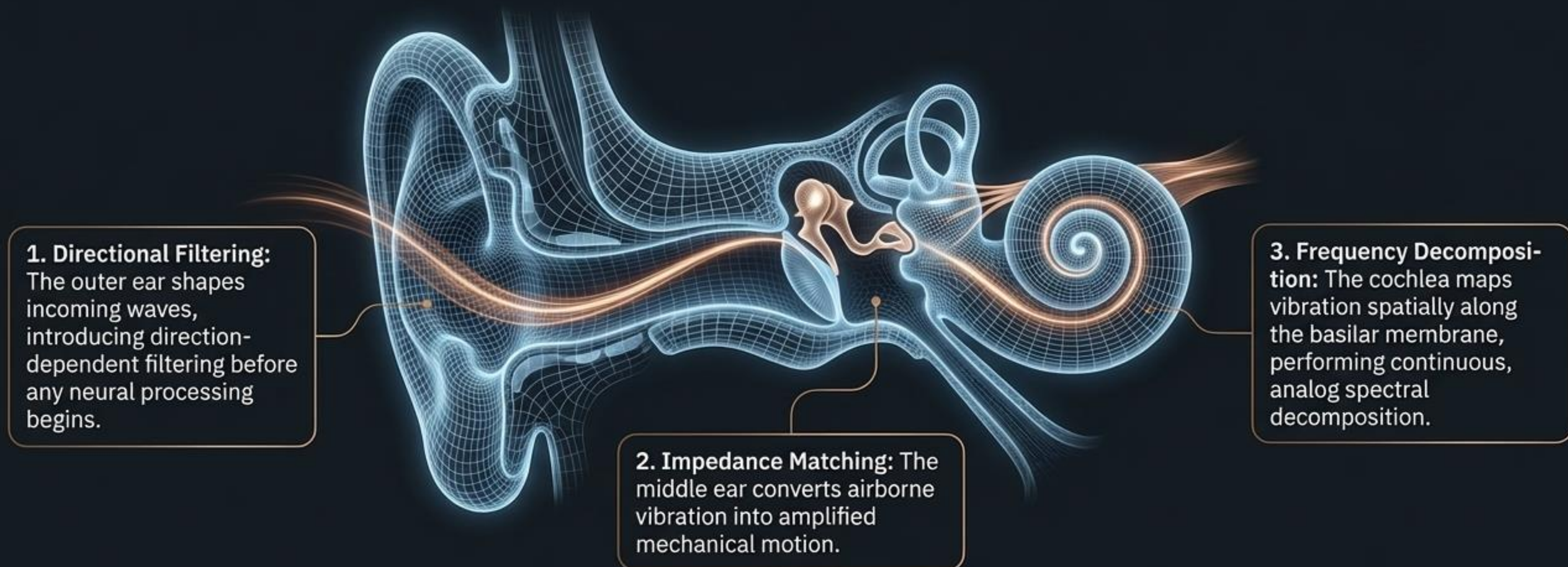
- Question: What is music?
- Approach: Categorization by historical narrative, aesthetic judgment, or stylistic taxonomy.
- Result: Music is treated as a collection of fixed objects.

## The FoM Framework




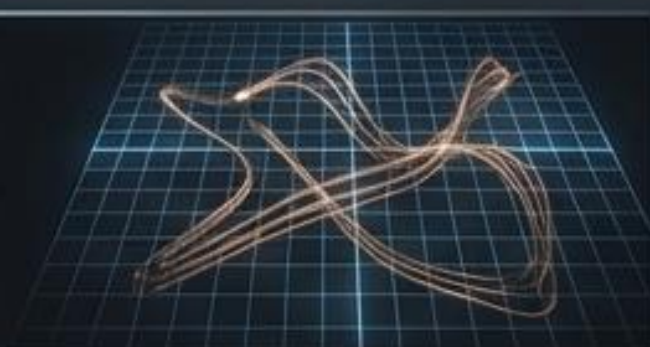

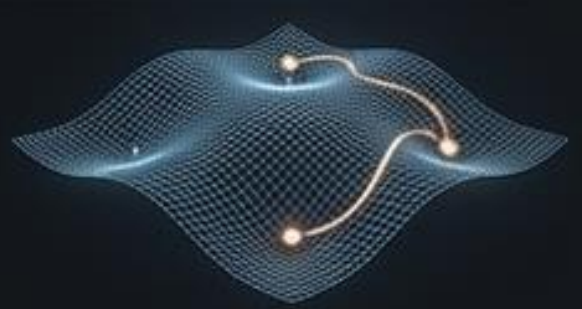




- Question: How do musical phenomena exist, evolve, and become perceptible?
- Approach: Modeling trajectories through structured state spaces.
- Result: Music is understood as a dynamic, continuous process of becoming.

Perception serves as the absolute boundary condition for musical structure.



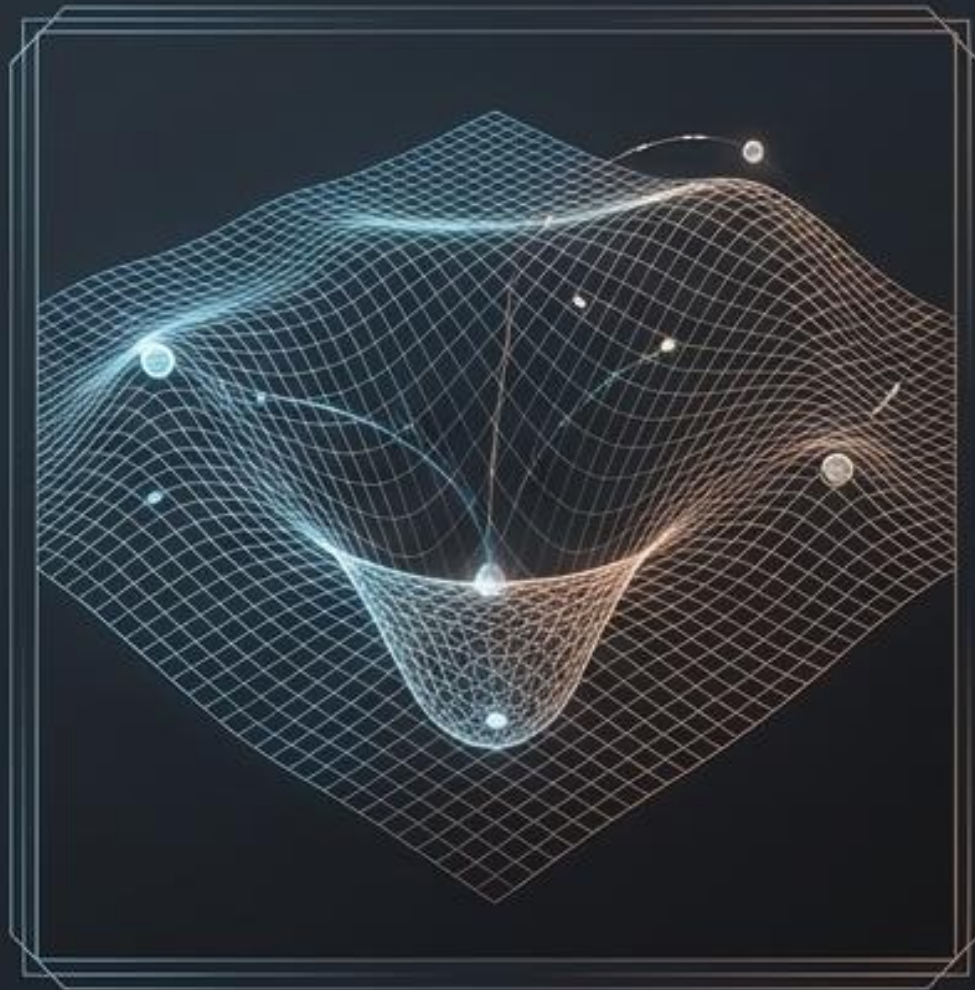
**Core Insight:** Neural interpretation begins from a pre-structured signal, not from raw sound. The human aural system establishes the field of viable exploration.

# Contrasting traditional theory with the Foundations of Music framework.

	Traditional Theory	The FoM Framework
Fundamental Units	Discrete objects (notes, motifs, isolated chords). 	Dynamic configurations and continuous trajectories within structured state spaces. 
Harmony & Pitch	Prescriptive rules and functional chord vocabularies. 	Simultaneous projections and attraction centers acting as constraints within a topological space. 
Style & Genre	Distinct historical taxonomies and cultural labels. 	Specific patterns of constraint, control, and transformation regimes. 
Performative Variation	Treated as secondary deviations from a primary written score. 	The essential, embodied realization of control vectors navigating the sound manifold. 

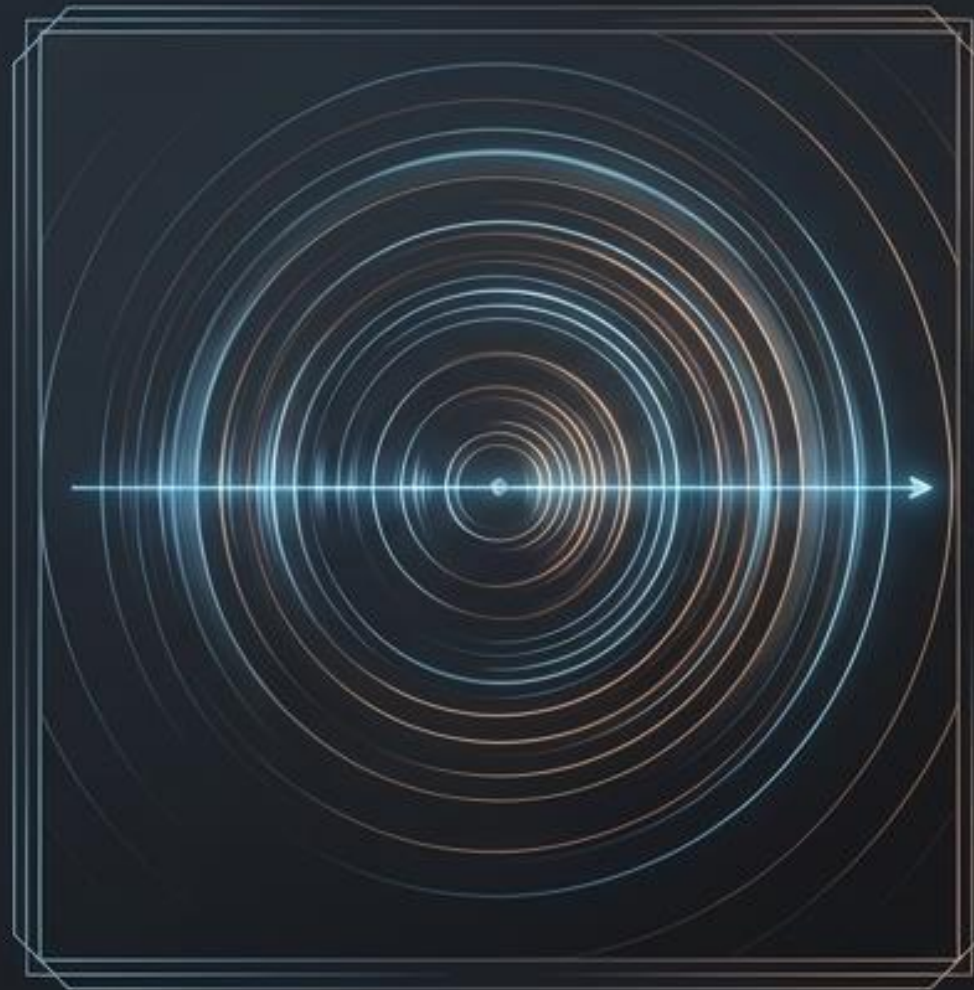
# Pillar I: Musical phenomena inhabit structured state spaces

## Pitch Space



Encompasses pitch relations, intervals, and tonal gravitation centers. It captures how pitches are organized, not just their physical frequencies.

## Rhythmic Space



Describes temporal organization, including timing relations, periodicity, pulse, and temporal grouping structures.

## Timbral Space



Represents spectral distribution, envelope characteristics, and the continuous noise-tone spectrum.

Pillar II: Control and gesture dictate navigation through musical space.

### The Nature of Control

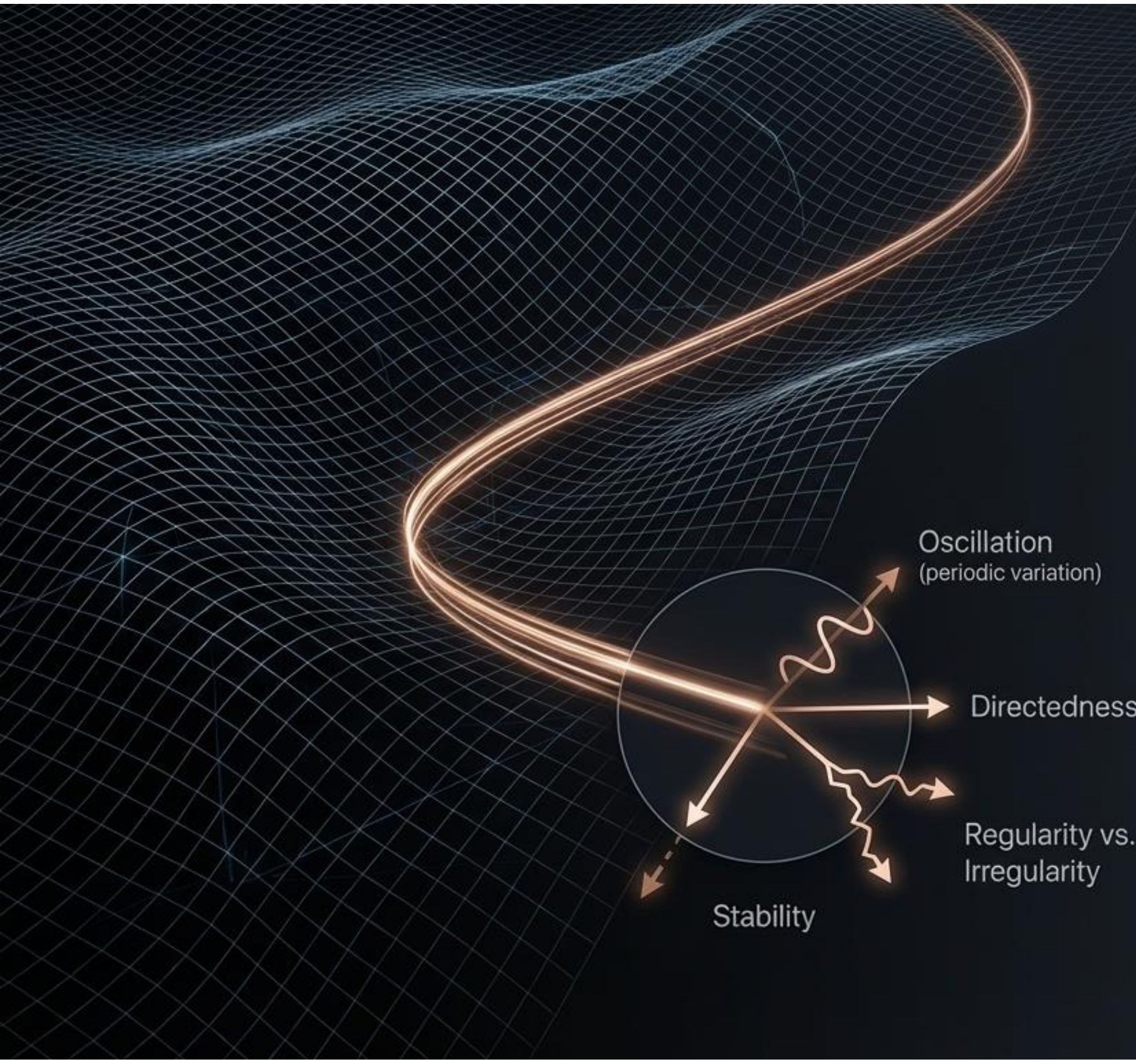
Control is not a static parameter value; it is the directed change applied over time.

A note is not an object, but a state produced under a specific control regime.

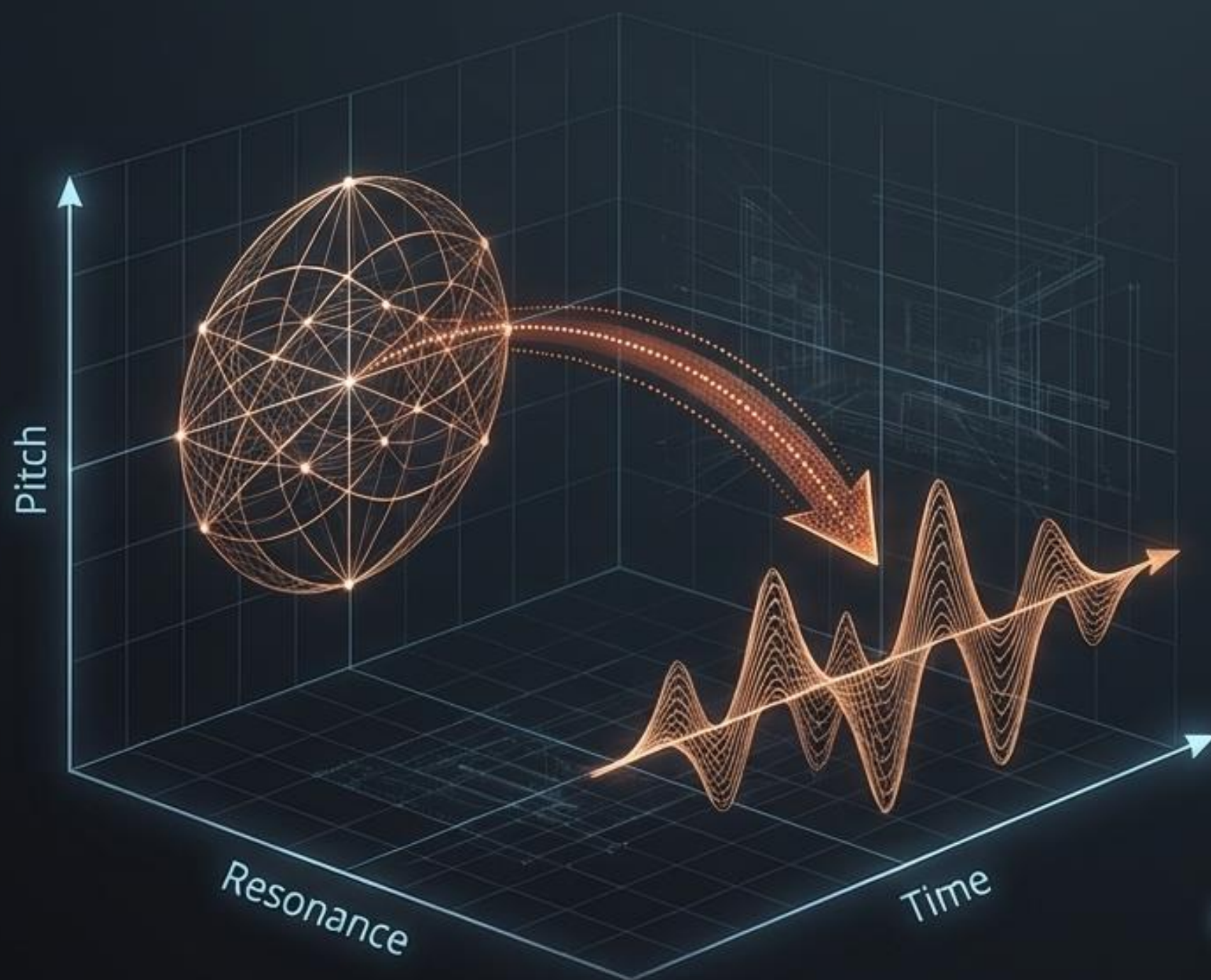
### Gesture as Embodiment

Gesture is the physical realization of control. It is a multidimensional trajectory perceived as a single coherent event.

**Takeaway:** Written notation is merely a partial specification; performance is the continuous navigation of the control space.



# Pillar III: Transformations preserve identity across shifting dimensions.



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## Intra-Space Transformation

Modification within a single space (e.g., Transposition in Pitch Space, where absolute frequencies change but interval relations and attraction centers are perfectly preserved).

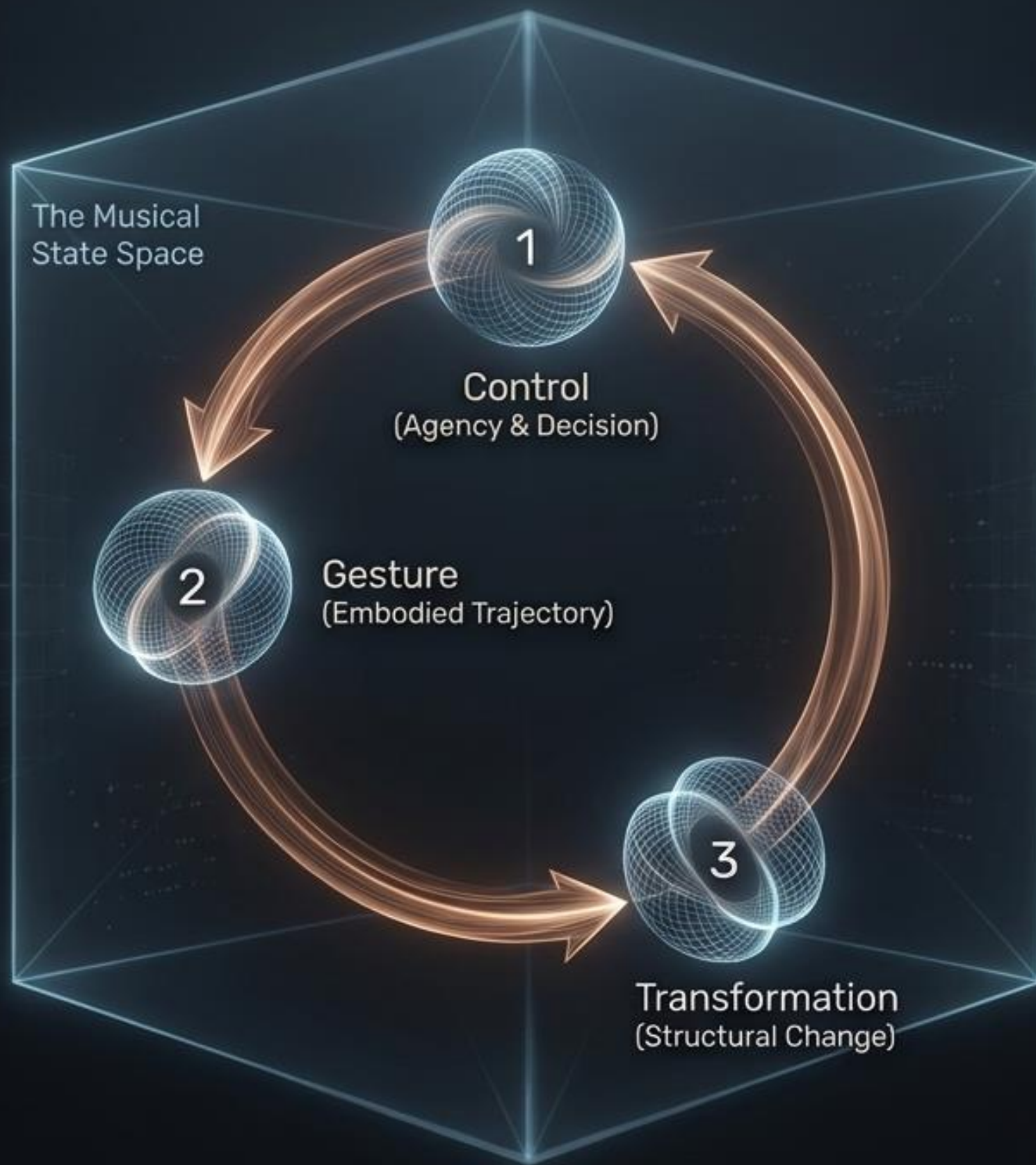
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## Inter-Space Transformation

Re-expressing a structure from one space to another.

- Pitch to Temporal: Melismatic structures mapped as rhythmic tension.
- Pitch to Resonance: Formant-harmonic alignment altering perceptual identity without changing pitch.

The Principle of Perceptual Equivalence: Two structures physically represented in entirely different state spaces are the same musical structure if they remain perceptually equivalent.



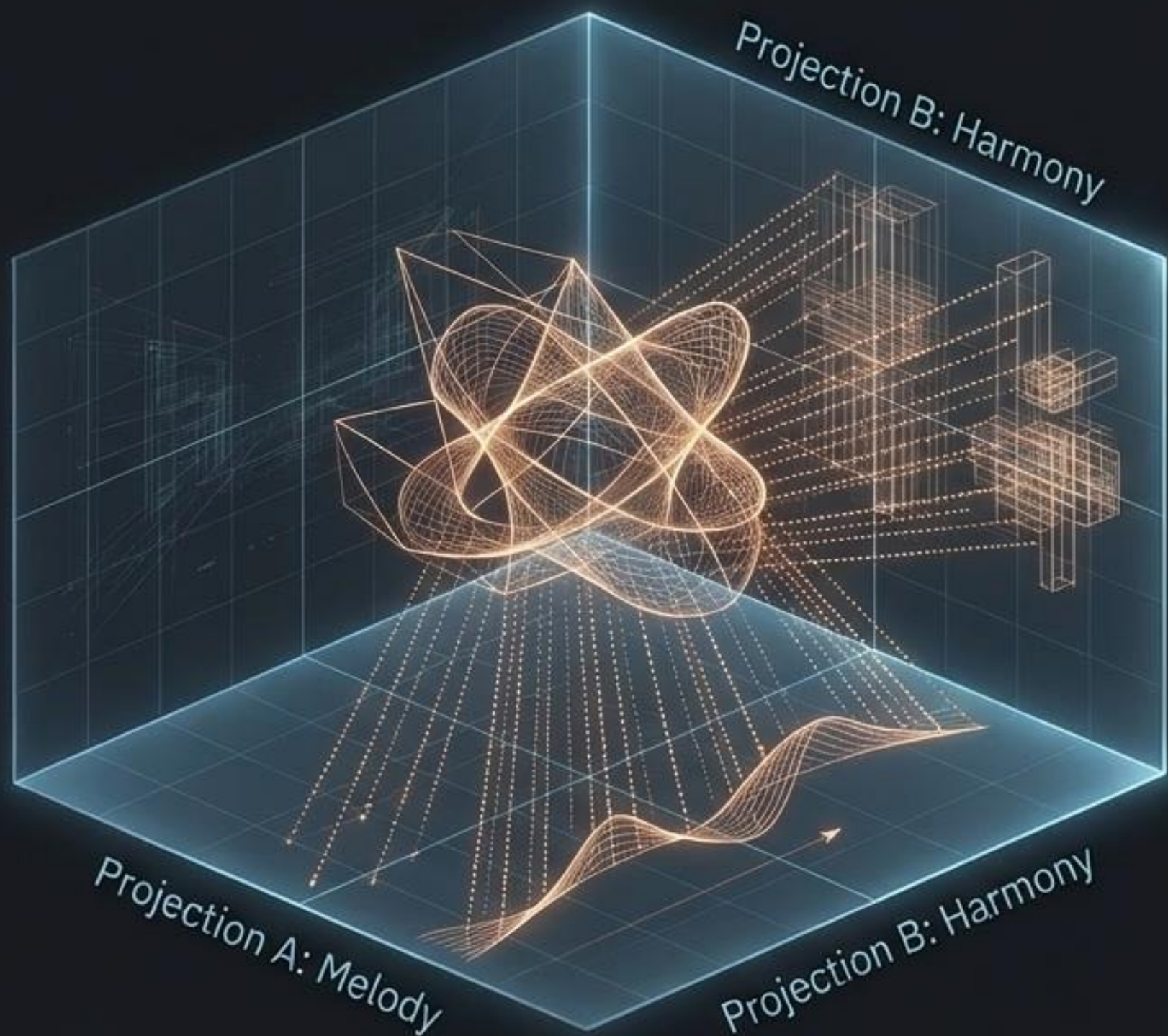
# The closed loop of musical becoming.

Music does not arise from isolated elements, but from this continuous feedback system.

Control activates the state spaces. Gesture embodies the trajectory. Transformation modifies the structure while preserving perceptual invariants.

Creativity is not producing objects from nothing, but constructing meaningful transformations between existing structures within this loop.

# Melody and harmony are distinct projections of a single pitch space.



## The Sculpted Manifold.

Traditional theory treats melody and harmony as separate, hierarchical domains.

The FoM framework reveals them as different geometric projections of the same underlying structural manifold.

Western harmony is simply one specific projection system, not a universal norm for organizing pitch space.

# Jazz is not a stylistic category, but a multidimensional transformation regime.



## Jazz Translation

Projecting a constrained melodic structure into expanded harmonic and performative spaces while preserving its perceptual anchor.

## Jazzing Around

Local exploration and variation in the immediate neighborhood of a musical object.

## Jazzing Along

Traversing an existing musical path while exploring parallel micro-trajectories, preserving global direction.

**Core Insight:** Jazz offers structurally coherent freedom. It is the act of searching for meaning within a highly expanded search space, constrained only by the melodic core.

# The structural mechanics of perceptual fatigue.

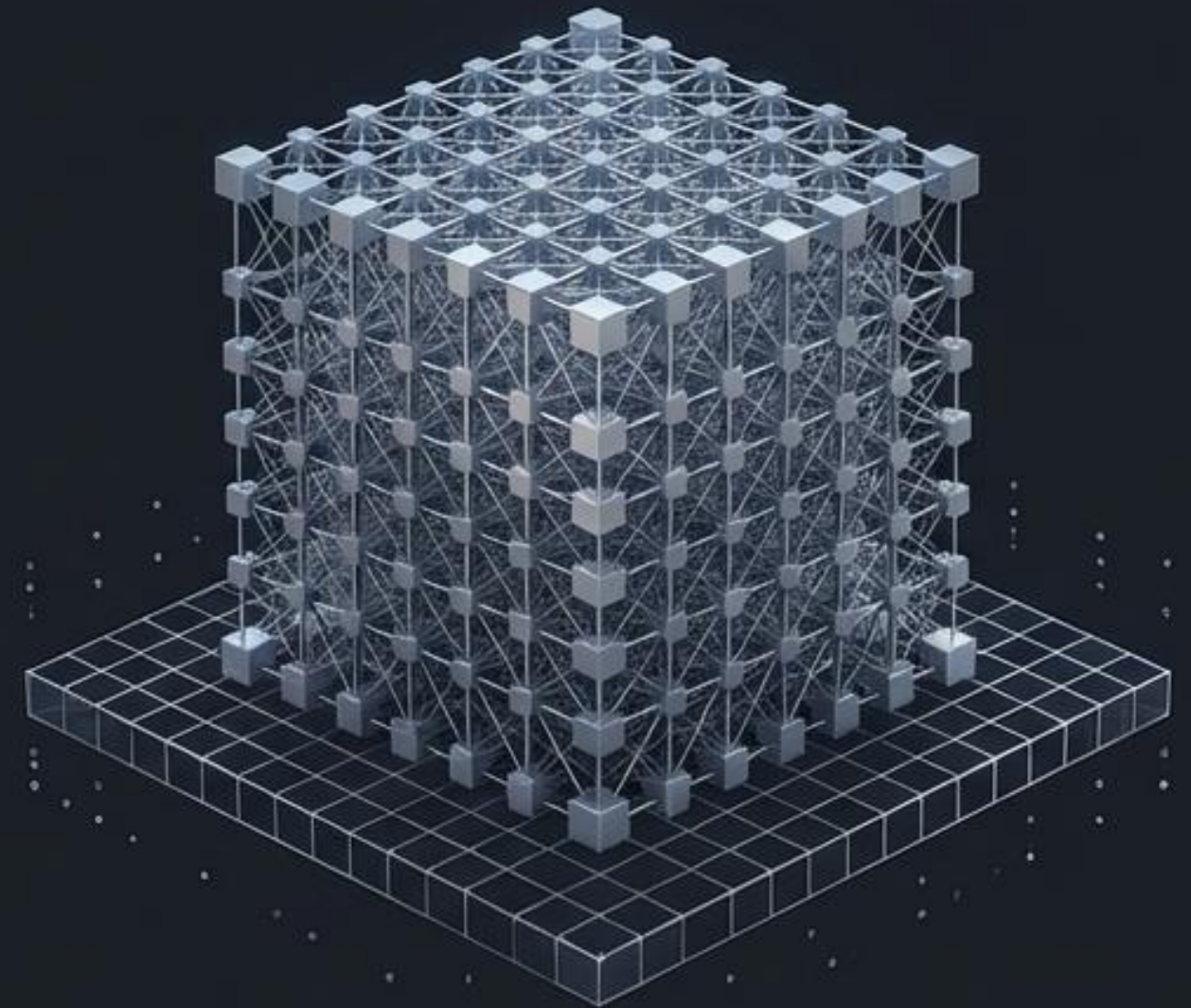
## Overstimulation



Mechanism: The local state space is excessively wide. Variation exponentially exceeds cognitive sampling capacity.

Result: Prediction error grows uncontrollably, leading to sensory chaos, noise, and cognitive overload.

## Over-Determinism

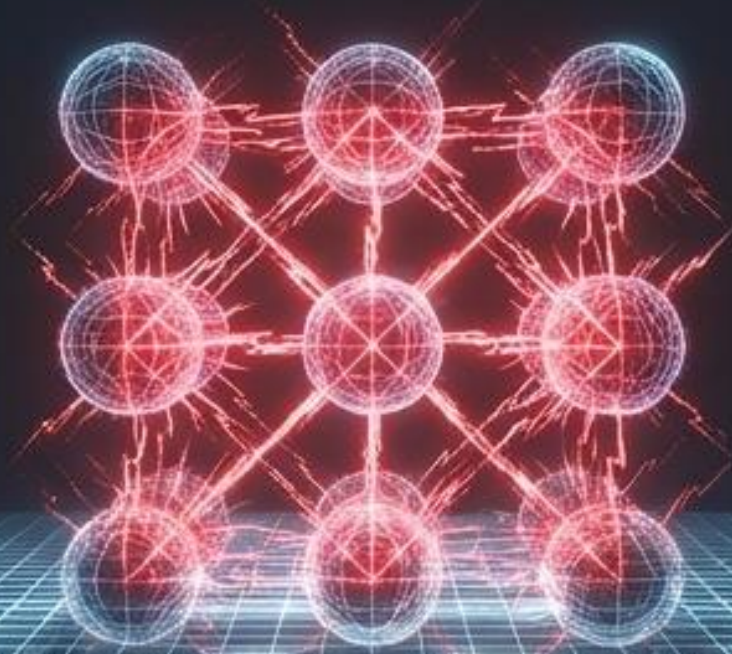


Mechanism: The admissible state space collapses. Outcomes become excessively predictable. Prediction error hits zero.

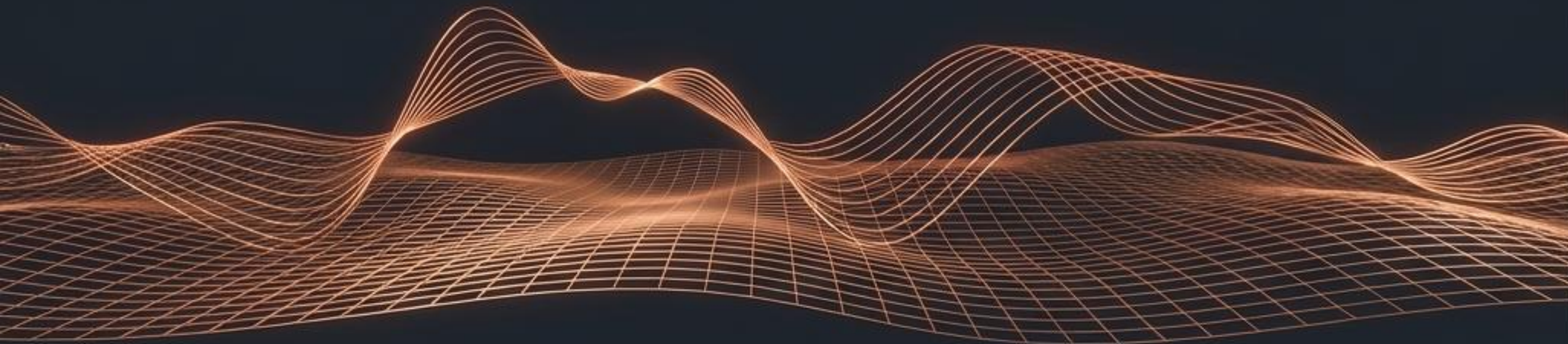
Result: The system stops producing informative variation. Coherence is perfectly preserved, but perceptual engagement is destroyed by redundancy.

# Harmony functions as a determinism amplifier

Simultaneous Constraint (Perfect Harmony)



Temporal Freedom (Monophony / Makam)



Temporal Freedom (Monophony / Makam)

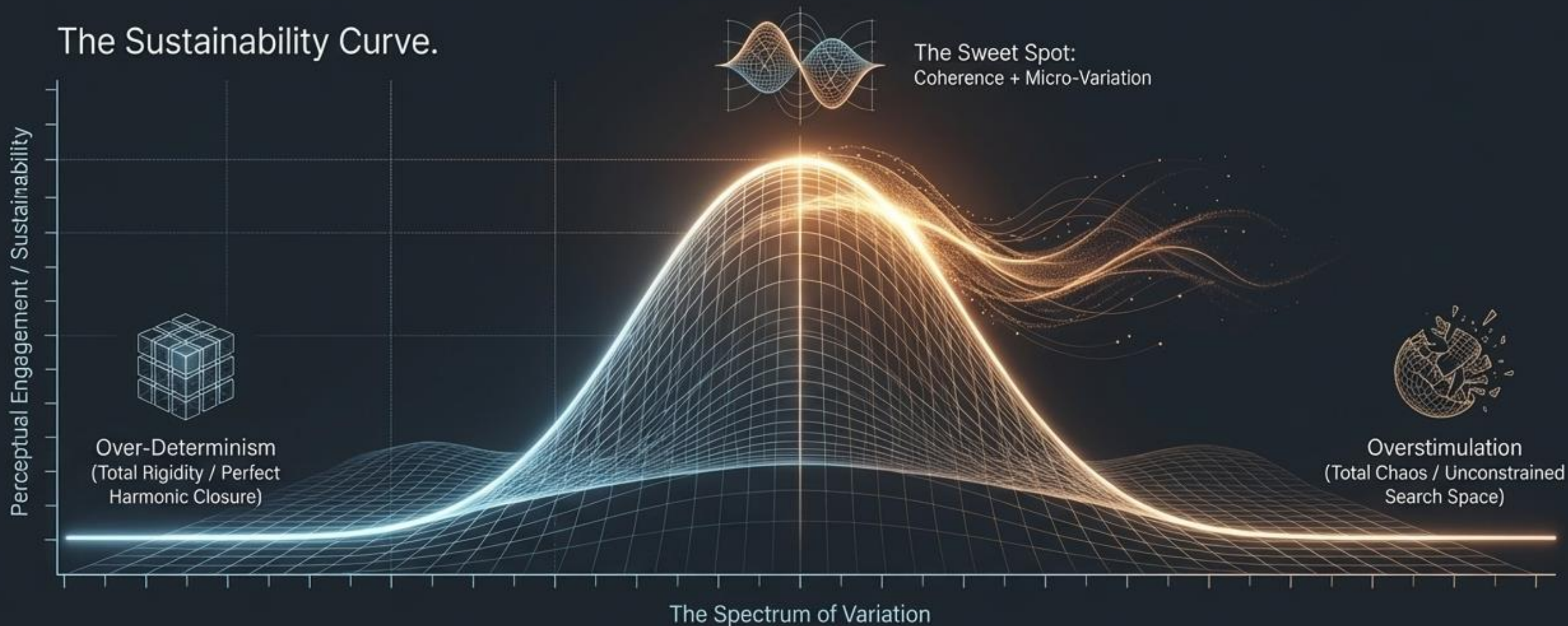
Highly harmonized, equal-tempered systems optimize for simultaneous spectral compatibility.

This optimization is highly costly: it rigidly restricts micro-variation and collapses the global space of expressive possibility.

Coherence is achieved through rigidity rather than flexibility.

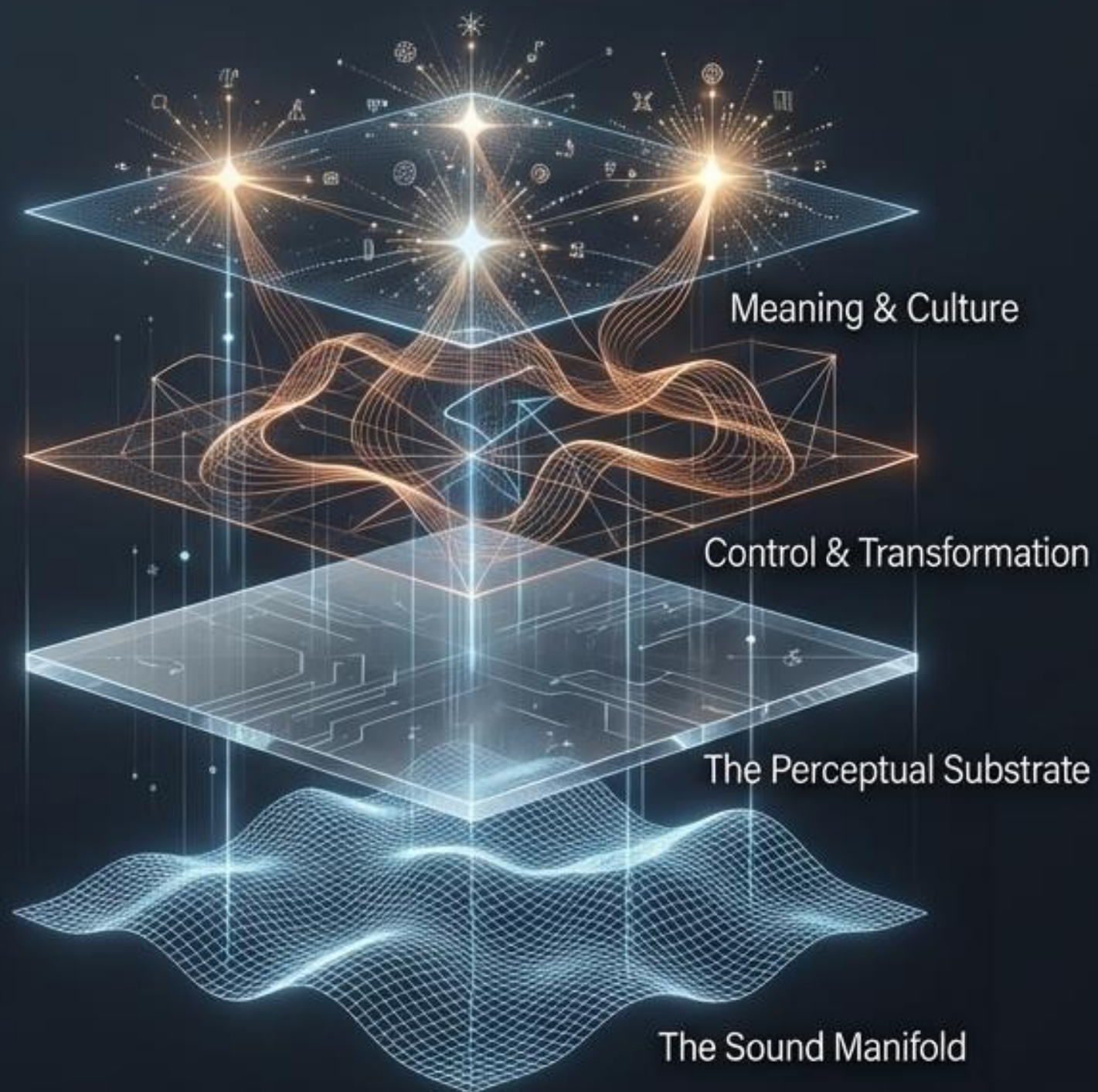
# Perceptual sustainability requires coherence without rigidity.

## The Sustainability Curve.



- Perfect harmonic closure is not an ideal terminal state; it is structurally unsustainable.
- Traditions like Jazz and Makam thrive in the peak zone by treating harmony as a statistical field and distributing micro-variation safely over time.
- Sustainable systems maintain a delicate balance: broad enough to prevent repetition, constrained enough to preserve recognizable projection.

# A structural definition of music



Music is a subset of the continuous sound manifold—constrained by human perceptual systems, dynamically structured through control and transformation, and uniquely capable of sustaining coherent exploration over time.

Emotion, meaning, and culture are not prerequisites for this definition; they are the magnificent emergent properties of this continuous structural navigation.