

Chaos Theory: a Tool for Creation and Critical Framework



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Conceptual Basis

A way to study nonlinear, dynamic systems

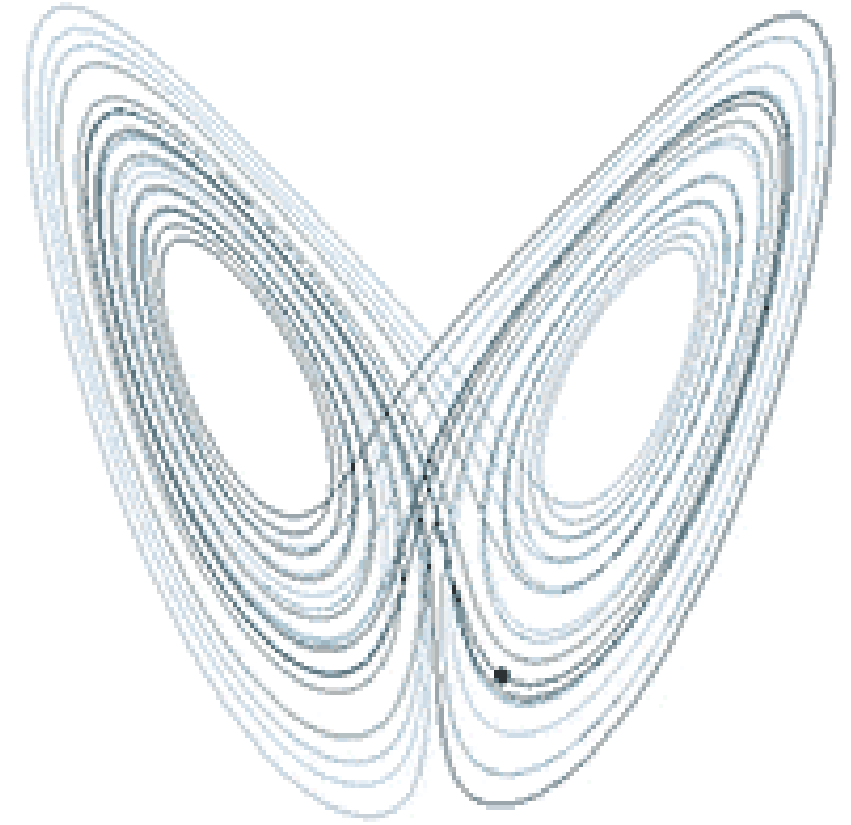
Chaos is “the generation of random, unpredictable behavior from a simple, but nonlinear rule” ¹

Features of deterministically chaotic systems:

1. Sensitive to initial conditions, exponential amplification of errors (the butterfly effect)
2. Difficult (or even impossible!) to predict long term behavior
3. Local instability/global stability
4. Noisy sounding output



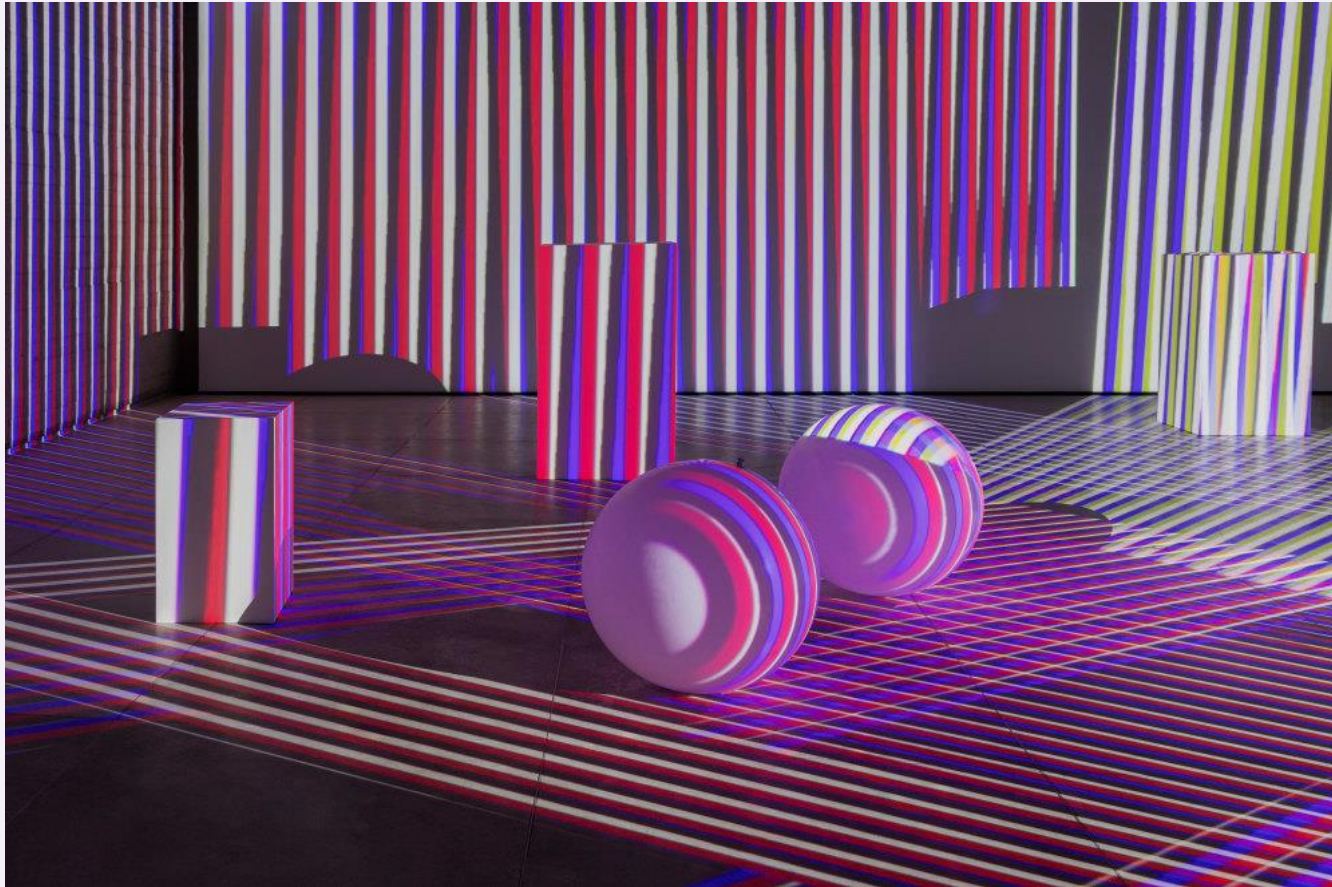
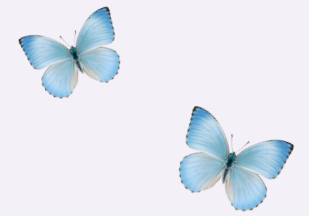
Deterministic: future behavior dependent on initial conditions



Example - Lorenz system!

- Very simple ODE system
- Certain parameters result in this looping Lorenz Attractor (has fractal structure)

Carlos Cruz-Diez - Environnement Chromointerférent¹



Two layers:

1. Vertical strips of color – change color depending on the distance/movement of the viewer
2. Layered over this is transparent surface of black lines – the "interference"

Chromatic interference modules are mapped onto the people and surrounding objects

Audience becomes active participant, described as both "actors" and "authors"

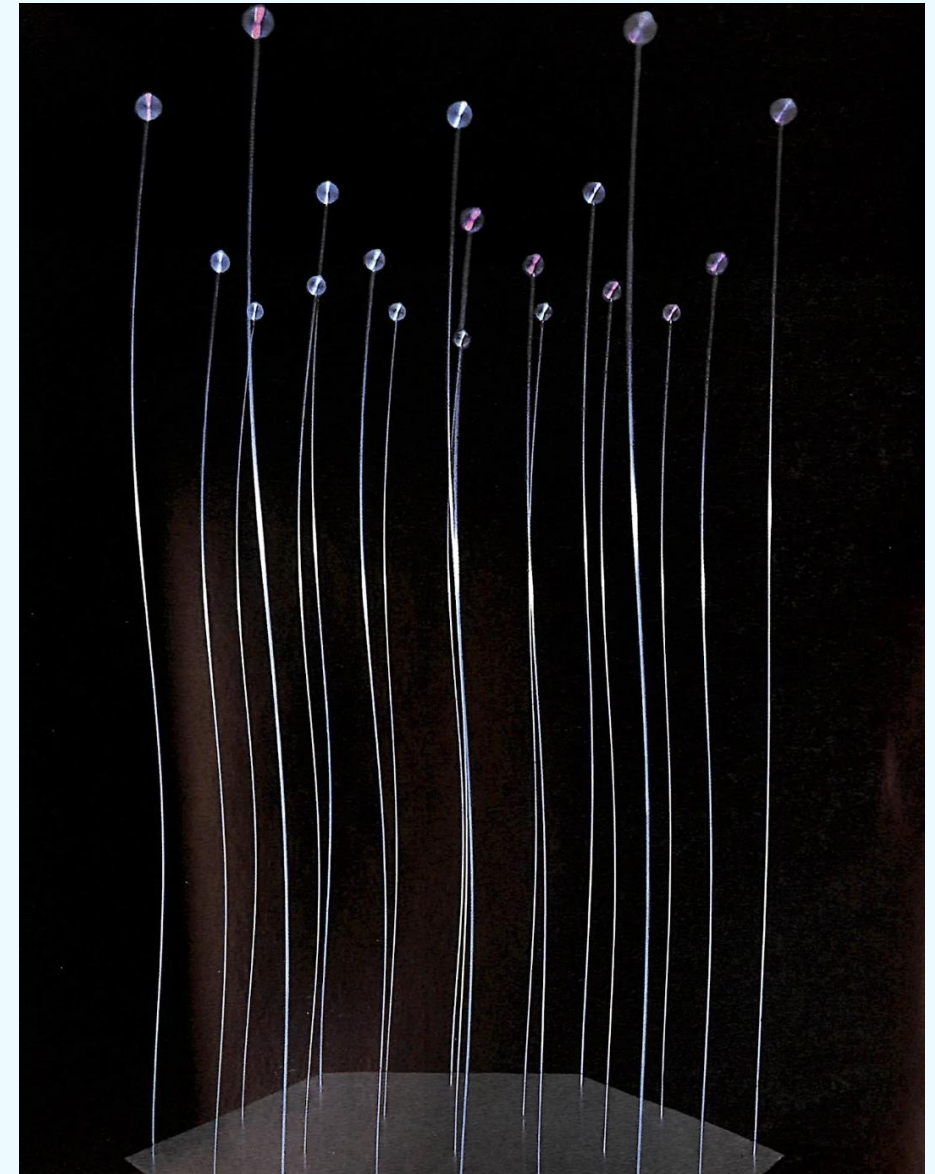
Wen-Ying Tsai – *System 1*¹

Wen-Ying Tsai's sculptures are examples of self-organizing systems – emergent structures

Bent stainless steel rods that consistently move in place. Strobe effect gives the appearance of faster/slower movement

Current is both disturbance to the system and also its source of energy

Picks up human sounds through microphone – extreme sensitivity to the surrounding environment





Otto Piene – *Light Room (Jena)*¹



Five light emitting sculptures in a room, motorized to create an immersive "play" or "ballet" of projections

Single light source is fractured into many dots, change appearance based on bulb distance and changing clarity/scale.

Overlaps in complex ways, resembling stars/constellations

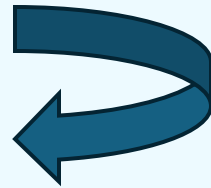


Chaos Theory as Framework for Viewing Human Tech Interactions:

Modern Tech and the Internal Black Box

“AI-driven behavioral design, which has been understood as feeding the addictive and illiterate propensities of our internal automaton – our black box” ¹

Design and variable-reward principle:



Updating stream of visual prompts

Internal triggers for attention/affirmation

Moholy-Nagy theory of hyperstimulation of the digital age ²

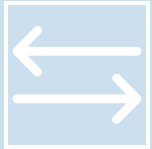
- Sensory overwhelm from constant stimuli
- Disembodiment caused by tech, combat this by engaging in bodily participation



Why is Chaos Theory Relevant?



Feedback loops: uncertainty of action, “fear triggers the repetition of the action to ensure that the outcome remains the same.” Also, consider bias feedback loops that are propagated forward.



Emergent behavior: complex behavior arising from simple interactions.



Nonlinearity: respond in non-linear ways to human interactions, disproportionate response to minor prompting

The Zairja Collective - *Neuropit #14*¹

Focuses on behavioral design and persuasive tech - "variable reward"

"Critical topology" between pits and neurons. Visual cortex neuron is surrounded by a mining pit. Brings to mind a network of data points, and widespread surveillance

Uncertainty and feedback loops, repeated actions



Thank you! :)

Sources

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