



GST-06 The Probabilistic Nature of the Future

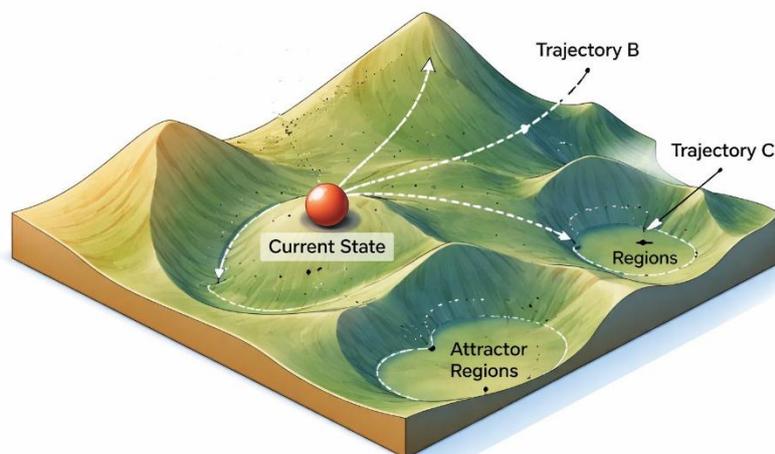
Formal Description

The future is probabilistic rather than predetermined. System trajectories unfold through branching possibilities shaped by contingent interactions among systems and their environments.

Plain English Explanation

Systems exist within a set of constraints that define what is possible. From any given situation, there are usually several possible future paths. Which path actually occurs depends on interactions, conditions, and sometimes decisions made by agents. This means the future is not random, but it is not fixed either. Rather, it is structured by constraints but open to different outcomes.

The future is constrained but not predetermined.



Example 1 – Weather

Meteorologists predict several possible storm tracks because atmospheric systems are highly complex.

Example 2 – Social Systems

Economic markets can evolve in different directions depending on policies, technological change, and human decisions.

Provenance and Links

The idea that the future is not fully predetermined has roots in both philosophy and science:

- Aristotle – distinction between necessary and contingent events
- Pierre-Simon Laplace – classical deterministic view that, given complete knowledge of all forces and positions, the future would be fully predictable. Modern science has shown limits to this view, through quantum uncertainty, complexity, and the interaction of multiple systems.



- Werner Heisenberg – fundamental limits to predictability in quantum mechanics
- Ilya Prigogine – irreversibility and probabilistic behaviour in complex systems
- Stuart Kauffman – open-ended evolution and the “adjacent possible”

In systems theory, probabilistic futures arise from the interaction of multiple processes under changing constraints, leading to branching pathways rather than fixed outcomes.

In EFGST, this is expressed in terms of trajectories through constraint-defined landscapes, where system evolution follows probabilistic paths shaped by interactions, feedback, and contingent events.

In contrast to probabilistic views of the future, some interpretations of Einstein’s relativity theory suggest a “block universe,” in which all points in time (past, present, and future) coexist within a fixed spacetime structure.

Practical Exercise

Identify a system where the future cannot be predicted exactly (for example the economy, weather, or a political system).

Describe two different possible future outcomes and explain what factors might influence which outcome occurs.