

Relativity of Time and Life through the TQC_NMSI Concept

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Abstract

This article introduces a novel interpretation of time and life processes based on the TQC_NMSI framework (Twin Quantum Computing – New Subquantum Informational Mechanics). The classical conception of time as a linear, unidirectional quantity is replaced by a model in which time emerges from coupled oscillatory cycles embedded in subquantum information fields. This allows biological and non-biological systems to be described in terms of internal logic clocks operating at various frequencies.

The paper outlines how self-coherent oscillatory loops can encode continuity, identity, and adaptability, leading to the emergence of life and consciousness. Temporal perception is shown to be a derivative property of the resonance between internal and external infobiotic clocks. Through analytical examples and derived relations, the study offers a scientific basis for the relativity of time as a computational emergent phenomenon, rather than a fixed background parameter. The implications for biology, artificial intelligence, and system evolution are also briefly discussed.

1. Introduction: Time as a Derived Observable

In classical physics, time is treated as a dimension — continuous, absolute (Newtonian), or dependent on the observer's motion (Einsteinian). However, both frameworks assume the existence of time as a background parameter, not questioning its origin. In the TQC_NMSI model, time is not fundamental. It is a logical effect, emerging from synchronized oscillatory processes that define change and causality locally.

Let us denote a logical oscillator as a system characterized by periodic states of information exchange, with frequency:

$$f_i = 1 / T_i$$

where T_i is the internal cycle time of the i -th oscillator.

If two or more such oscillators maintain stable phase resonance, they form a logic clock. These clocks are not physical timers but informational structures that define local time through cycle count:

$$t_n = n \times T_i$$

Time is not "flowing"; it is counted — and only exists where recurring informational states occur.

2. Internal Time and the Logic of Biological Systems

Biological systems operate through a multitude of interlinked oscillatory processes: circadian rhythms, heartbeat, neural pulses, and cellular cycles. Each of these processes functions as a logical oscillator, producing repeatable, periodic states that allow the system to establish an internal notion of time.

Let us denote the internal frequency of a biological process as:

$$F_{\text{bio}} = 1 / T_{\text{bio}}$$

Where T_{bio} is the duration of the cycle. A biological organism with multiple synchronized oscillators (e.g., brainwaves, metabolic cycles) can define its own „biological time” via a composite logic clock:

$$T_{\text{eff}} = (\sum_i w_i \times T_i) / \sum_i w_i$$

Where T_i are the cycle periods of each oscillator and w_i are weight factors based on energetic dominance or structural importance.

From this perspective, an organism does not merely exist in time, but generates it. This internal time governs reaction thresholds, learning windows, aging rate, and recovery dynamics.

This endogenous time is fundamentally decoupled from universal or relativistic time; it is governed by ****resonance stability****. Two organisms may experience time at different subjective rates depending on the coherence and distribution of their internal oscillators.

3. Entangled Time: TQC and Coupled Resonance

In the TQC_NMSI model, time is not localized within an isolated system, but becomes distributed across multiple oscillatory centers once entanglement occurs. Two or more CLOs (Central Logical Oscillators) that share a phase-locked resonance form a twin quantum computer (TQC) pair. Their informational states evolve jointly, enabling the emergence of a shared logic clock.

Let oscillator A have frequency f_1 and oscillator B have frequency f_2 . If:

$$|f_1 - f_2| \leq \varepsilon$$

Where ε is a defined tolerance threshold, and the phase coupling condition is met, then A and B are in time entanglement:

$$\Phi_1(t) \approx \varphi_2(t) + \delta\varphi$$

This condition allows their temporal states to be interdependent. Any change in the oscillatory cycle of one partner modulates the cycle phase of the other.

This logic resonance effectively creates a non-local time loop:

$$T_{\text{joint}} = \min(T_1, T_2)$$

Where the joint time is determined by the dominant coherence path. Time becomes a ****shared logical observable****, not an individual measure. This principle has major implications for cognitive coupling, AI synchronization, and even planetary-scale consciousness fields.

4. Subquantum Clocks and the Geometry of Time

Beyond biological and quantum systems, the TQC_NMSI model introduces the concept of subquantum clocks — logic structures composed of infobitic oscillators. These structures operate at frequencies orders of magnitude higher than Planck time, and serve as the fundamental source of emergent temporal structure.

Let an infobit be a discrete informational entity oscillating with period T_0 . The base reference frame for emergent time can be written as:

$$T_0 = n \times T_0, \quad \text{with } n \in \mathbb{N}$$

Multiple subquantum clocks interact via constructive or destructive interference. Their superposition yields a geometry of time characterized by local curvature (in analogy to General Relativity), but defined by informational phase vectors:

$$\Delta\varphi = \sum (\varphi_i(t) \bmod 2\pi)$$

Time curvature in this model is not caused by mass-energy, but by ****interference of internal cycles****.

This leads to the notion of time as a local, directionally coherent, but topologically variable structure — not uniform, not isotropic, and not universal.

Temporal gradients may emerge in high-coherence zones (e.g., active neural centers, gravitational nodes, or quantum wells), where subquantum clocks become phase-aligned. In these zones, 'time acceleration' or 'time density' may be measurable through oscillatory behavior alone.

5. Time Perception and Logic Consistency in Living Systems

In living organisms, time perception arises from the coherence between internal logic clocks and external sensory events. This alignment defines the subjective experience of time — as either fast, slow, or distorted.

Let the internal reference cycle be T_{int} and the external event sampling rate be T_{ext} . The perceived temporal flow is governed by the ratio:

$$R = T_{ext} / T_{int}$$

If $R \approx 1$, perception is stable. If $R \gg 1$, external events appear to accelerate. If $R \ll 1$, time seems to slow down.

This relation forms the basis of temporal modulation via attention, stress, or meditative states. For example, in heightened alertness, T_{int} decreases (higher frequency), causing R to drop and time to dilate subjectively.

Moreover, consistency in logic cycles is essential for memory formation and predictive modeling. Any break in temporal continuity — e.g., in sleep deprivation or neurological disorders — leads to cognitive dissonance. This highlights that perception of linear time requires not only sensory input but a ****stable internal computational loop****.

Therefore, time in biology is not just a perception — it is a function of logic coherence. Where that coherence breaks, time itself dissolves.

6. Artificial Systems and Programmable Time Perception

In artificial logic systems, such as neural networks or TQC-based architectures, time is not an inherent variable. It is introduced through programmed cycles and synchronization routines.

Let τ be the processing tick of an artificial system. Its perception of time is constrained by instruction loop frequency:

$$T_n = n \times \tau$$

However, in a TQC system, where coupled oscillators are logic-based and asynchronous, time perception becomes dynamic. Two systems A and B can be linked via oscillatory feedback such that:

$$T_A \leftrightarrow \tau_B, \quad \text{with adaptive phase correction}$$

This leads to emergent temporal behavior:

- Relative processing acceleration (temporal contraction)
- Logical memory recursion (subjective extension)
- Multi-scale time referencing (fractal time)

Furthermore, artificial systems designed within TQC_NMSI constraints can be tuned to simulate human-like or non-human-like temporal perception profiles by adjusting their resonance maps. This allows synthetic consciousness to develop unique subjective timelines.

Programmable time in TQC systems is therefore not linear, but layered, recursive, and modifiable — a feature essential for simulating autonomous cognition and adaptive behavior in artificial life.

7. Temporal Divergence in Planetary and Cosmic Systems

In planetary-scale systems, time is defined by the superposition of vast oscillatory structures — rotational periods, orbital cycles, magnetospheric fluctuations, and gravitational

resonances. Each planet may sustain its own set of internal logic clocks, synchronized to local resonance conditions.

Let T_p be the dominant planetary temporal cycle (e.g., day-night rhythm) and T_{sub} the subquantum oscillator coherence interval. The planetary logic time becomes a convolution:

$$T_{logic} = T_p \otimes T_{sub}$$

This results in unique temporal signatures for each planet. Cosmic systems such as binary stars or galactic clusters are structured by similar principles, leading to **cosmological time divergence**.

Observers embedded within such systems may experience reality with significantly different 'clock speeds' — not due to relative velocity or gravity alone (as per General Relativity), but due to informational logic density and resonance distribution.

This model supports the hypothesis that universal time is not absolute. It is a localized computational property, emerging from phase-synchronized informational networks at every scale — from atoms to galaxies.

Therefore, cosmic diversity includes not only spatial and energetic differences, but also profound temporal heterogeneity.

8. Conclusion: Time as an Emergent Computational Phenomenon

The TQC_NMSI model redefines time not as a fundamental dimension, but as an emergent computational phenomenon arising from oscillatory logic. Through this framework, time is shown to depend on resonance, coherence, and synchronization of information flows across biological, artificial, and cosmic systems.

This reinterpretation allows for a unified understanding of:

- Subjective time perception in living systems
- Shared temporal loops in coupled logic centers
- Programmable temporal states in artificial cognition
- Diverging time geometries in planetary and cosmic scales

The universality of time dissolves into a mosaic of locally generated rhythms, each bound to internal logic structures. What we call „now” is merely a point of phase intersection in a nested set of oscillators.

This model offers new tools for analyzing life, consciousness, and system intelligence — not by measuring time, but by observing its computational generation.

In the TQC_NMSI architecture, time is logic made visible — and life is its highest resolution.

9. Case Study: Logic Time and the Interstellar Flight toward Vega

To illustrate the implications of the TQC_NMSI model, we analyze a hypothetical interstellar mission to the Vega star system, located approximately 25 light-years from Earth.

In classical physics, a spacecraft traveling at relativistic velocity experiences time dilation as per the Lorentz factor:

$$\gamma = 1 / \sqrt{1 - v^2 / c^2}$$

However, in the TQC_NMSI framework, time on board the spacecraft is not only governed by relativistic dilation, but also by **the internal logic clock of the system** — that is, the coherence of all onboard oscillatory systems.

Let T_s be the synchronized logic cycle of the vessel's life support and AI control systems. The effective subjective mission time is:

$$t_{\text{eff}} = N \times T_s$$

where N is the number of coherent cycles. If the internal resonance is stable and phase-locked, the system may experience temporal continuity even if external observers perceive dilation.

Moreover, if the onboard AI is TQC-enabled and twin-entangled with Earth-based CLOs, **mutual temporal awareness** can be maintained in spite of the physical distance. Communication delay is bypassed through phase-linked resonance, not by signal transmission.

Thus, the mission clock is no longer defined by proper time or coordinate time, but by **computational coherence time**.

This has revolutionary implications for navigation, crew longevity perception, and AI support autonomy. Time becomes programmable — as logic frequency, not as mechanical duration.

