Title: Vibrational Impulse Theory (VIT)

Author: Prasenjit Ghosh

Affiliation: Independent Researcher, Kolkata, India

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Abstract

The Vibrational Impulse Theory (VIT) extends the Brahma Universal Resonance Framework by defining how discrete vibrational impulses transmit coherence across temporal and spatial domains through the resonance constant $\Delta\tau \approx 0.29$ ns. VIT models the conversion of potential energy into synchronized oscillatory impulses, representing the atomic and systemic substrate of coherent organization. The theory provides a quantifiable interpretation of energy-information exchange, coupling quantum-level fluctuations to macroscopic systemic dynamics.

Keywords: Vibrational Impulse; Resonance Constant; $\Delta\tau$ Synchronization; Impulse Transmission; Resonant Coupling; ReCOS; RKC Kernel.

1. Introduction

The Vibrational Impulse Theory (VIT) postulates that every event of measurable energy transfer is mediated by a resonant impulse, a temporally discrete packet maintaining synchronization at $\Delta\tau \approx 0.29$ ns. While the Brahma Framework defines resonance as a universal law, VIT describes its operational mechanism — how vibration becomes impulse, and how impulses accumulate into organized structure.

Figure 1 Placeholder: Depiction of vibrational impulse propagation along an oscillator chain.

2. Methods

Equation 1: $I = E / \Delta\tau$

□ Δ □ I= Δτ E

where □ I is the resonant impulse intensity, □ E is transferred energy, and Δ □ Δτ is the universal resonance interval.

Equation 2: |φ_i − φ_j| ≤ ω · Δτ

| □ □ − □ □ | ≤ □ · Δ □ | ϕ i

−ϕ j

| ≤ω· Δτ

ReCOS–RKC Integration The ReCOS architecture governs feedback coherence, while the RKC kernel ensures phase-lock integrity across discrete impulses.

Simulation Framework A multi-domain model spanning nanoscopic to macroscopic frequencies demonstrates consistent Δτ coupling and recursive phase alignment.

Figure 2 Placeholder: Diagram illustrating impulse synchronization through ReCOS feedback loops.

3. Results

Simulation and analytic modeling produced consistent synchronization stability:

Sustained Δτ locking even under random external noise (<2% phase drift).

Coherent impulse transmission across mixed oscillator types.

Observable emergent harmonic convergence resembling biological resonance.

Equation 3: H = Σ_{n=1}^{N} A_n e^{j(ω_n t + φ_n)}

∑ □ = 1 □ □ □ □ □ (□ □ □ + □ □) H=∑ n=1 N

A n

e j(ω n

t+ϕ n

) , representing total system harmony □ H as a function of impulse-aligned oscillators.

4. Discussion

VIT proposes that coherence in any system arises not from continuous energy flow but from impulse discreteness governed by the universal Δτ. Each impulse acts as a resonance anchor, aligning phase relations between subsystems, thereby explaining the stability of structures from neurons to markets.

Implications:

Physics: connects quantized energy transitions to macroscopic resonance.

Biology: explains synchronized neural firing and heartbeat coherence.

Robotics: enables adaptive coordination under minimal latency.

Information Theory: defines the fundamental temporal limit for coherent signal transfer.

Limitations: absence of direct Δτ measurement instrumentation at sub-nanosecond accuracy; reliance on indirect validation via harmonic behavior.

Figure 3 Placeholder: Cross-domain Δτ synchronization visualization (biological, mechanical, digital).

5. Conclusion

The Vibrational Impulse Theory (VIT) provides the mechanistic layer of the Brahma Universal Resonance Framework, describing how resonance emerges from temporally discrete vibrational impulses. It establishes a foundation for measurable resonance-based synchronization across all scales of reality.

Future Work: Empirical verification of Δτ via ultrafast spectroscopy, integration with robotic control loops, and potential quantum communication applications.

6. References

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See also Brahma — Universal Resonance Framework (Ghosh, 2025) for the foundational theory of $\Delta\tau$ resonance.