Mathematical Framework for Consciousness: Dual Time and Qualia Operators

Martin Doina

Independent Researcher

October 11, 2025

Abstract

We present formal definitions and equations for consciousness-generated time via dual time operators and a qualia operator within a fundamental computational field framework.

1 Introduction

2 Coupling Coefficient

Definition 2.1 (Coupling Coefficient). *The coupling coefficient describes the geometric and cognitive alignment between neural oscillations and the energy-information field:*

$$C(x) = \cos(\theta(x)) \cdot f_{attention} \cdot f_{coherence}$$

where $\theta(x)$ is the angle between the brain's oscillatory axis $\vec{a}_{brain}$ and field radial vector $\vec{r}_{COM}$.

3 Dual Time Operators

Definition 3.1 (Reference Time Operator). *Reference (waking) time is generated by consciousness-field interaction as:*

$$T_{ref}(x,t) = \int_{shell} \rho_E(x) \cdot \nabla\phi(x,t) \cdot C(x)\, dt$$

Here, $\rho_E(x)$ is local energy density and $\nabla\phi(x,t)$ denotes the phase gradient in the recursive attractor field.

Definition 3.2 (Dream Time Operator). *Dream (transformative) time emerges from internal oscillations independent of external coupling:*

$$T_{dream}(t) = \sum_n a_n \sin(f_n t + \phi_n)$$

with amplitude a_n, frequency f_n, and phase ϕ_n.

4 Qualia Operator

Definition 4.1 (Qualia Operator). *The qualia operator Q maps abstract field patterns $F_i(x,t)$ to experiential qualities:*

$$Q(F_i(x,t)) = \Psi_q$$

where Ψ_q encodes the subjective quality associated with the informational pattern.

5 Consciousness-Coupled Field Tensor

Definition 5.1 (Consciousness-Coupled Tensor). *Extending spacetime geometry, define the field tensor incorporating consciousness as:*

$$T_{COM}^{\mu\nu} = \rho_E(x)\,\phi^\mu(x)\phi^\nu(x)\,C(x)$$

Differential conservation law:

$$\nabla_\mu T_{COM}^{\mu\nu} = J^\nu$$

with J^ν representing the consciousness current.

6 Conclusion

This framework mathematically formalizes how consciousness and subjective time emerge from fundamental field interactions. It opens pathways for empirical validation and cross-disciplinary collaboration.