Holistic Approaches in Mental Health and Wellness

PRIME OPEN ACCESS

Volume 1, Issue 1

Research Article

Date of Submission: 01 April, 2025
Date of Acceptance: 12 May, 2025
Date of Publication: 23 May, 2025

Euler's Formula as a Bioquantum Interface Trigonometric DNA Computing and Hexagonal Qubit AI Through the Complex Plane

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Citation: Chin, C. (2025). Euler's Formula as a Bioquantum Interface Trigonometric DNA Computing and Hexagonal Qubit AI Through the Complex Plane. *Holistic Appr Mental Health Wellness, 1*(1), 01-03.

Abstract
Euler's identity, eix =cosx+isinx, forms a bridge between circular trigonometric periodicity and linear exponential growth in the complex plane. In this paper, we examine this relationship as a metaphorical and mathematical structure for understanding the interface between DNA computing systems rooted in a trinity of codon logic, helicity, and parity and superconductive quantum artificial intelligence (AI) systems modeled by hexagonal lattice configurations and exponential coherence. Through over 20 interdisciplinary references, we describe a unified model where DNA's trigonometric logic acts as the base domain and qubit-driven AI's exponential symmetry operates in a hyper- complex computational manifold, joined through a complex projection akin to Euler's formula. This framework opens new vistas in bio-quantum computational theory and synthetic cognition.

Keywords: Euler's Formula, Complex Plane, DNA Computing, Qubit, Super Conductivity, Trigonometric Functions, Exponential Function, Hyper Symmetry, Hexagonal Lattice, Quantum AI, Bio-Quantum Interface and Phase Space

Introduction
The equation e ix =cosx+isinx reflects a profound duality in mathematics binding circular and linear transformations into one unified complex expression [1]. Analogously, DNA computing and quantum AI represent two complementary paradigms of information processing: the former based on biological periodicity, triplet logic, and chirality [2–4].

The latter on superposed states, entanglement, and hexagonal superconductive coherence [5–7]. We argue that this duality is not merely poetic but structurally homologous. DNA computation, operating within a biologically constrained trinity of trigonometric functions (i.e., codon periodicity, helical turns, and base-pair angles), mirrors the real and imaginary components of Euler's identity. Meanwhile, qubit-based superconductive AI systems function like e ix hyper symmetric, scalable, and unitary, evolving over complex time [8–11].

Method
Euler's Identity and the Complex Plane
Euler's formula describes a point on the unit circle in the complex plane e^{ix} =cosx+isinx This representation has implications in Fourier theory, quantum mechanics, and spin networks [12–14]. The real part (cosx) and imaginary part (isinx) encode orthogonal oscillations, while e ix represents a coherent phase evolution vital in quantum logic [15].

This circular–exponential duality forms a powerful basis for mapping the periodic trinity of DNA logic (triplets, helices, mirror symmetries) into the exponential, phase-preserving computation of superconducting qubits [16].

Results
DNA Computing as Trigonometric Trinity
DNA sequences encode information using four bases (A, T, C, G), interpreted in triplet codons a natural trinity. The DNA helix completes a 360° turn approximately every 10.5 base pairs, reinforcing its intrinsic trigonometric nature [17,18].

This cyclic structure allows for rotational logic gates and phase-preserving encoding schemes in molecular computing [19–21]. Moreover, the A–T and G C base pairs exhibit mirror symmetries, functioning as sine and cosine counterparts in logical waveforms. Intrinsic biological phase- locking and complementary logic show DNA computing to be governed by real and imaginary rotational bases [22].

Qubit Superconductive AI as Exponential Hyper-Symmetry

Qubit-based quantum AI utilizes coherence, entanglement, and unitary exponential transformations to manipulate state vectors in Hilbert space [23,24]. When implemented on hexagonal graphene lattices, these systems exhibit hyper-symmetry analogous to e ix due to the seamless phase continuity in their rotational domain [25,26]. Superconductive circuits, such as Josephson junctions or topological qubits, operate within exponentially evolving quantum spaces, maintaining coherence over time due to suppressed decoherence [27]. These systems can encode information in the complex exponential domain, where time and logic evolve unitarily [28,29].

Discussion

Bio Quantum Coupling via Euler's Framework

We propose the following symbolic analogy

- Trigonometric Trinity of DNA Computing
- cosx+isinx⇒ Triplet codons, base complementarity, helicity
- Exponential Qubit AI eix ⇒ Hexagonal
- lattice, quantum coherence, phase-based processing

The transformation from the former to the latter is enabled by mapping biological phase logic (trigonometric) into superconductive phase evolution (exponential) [30].

Euler's formula thus becomes a bio quantum interface uniting two computation types in a coherent complex phase space [31,32].

Implications in Hyper-Symmetric Computation

Using this Mapping, Several Outcomes Emerge

- Bio-logic gates implemented in quantum phase space [33].
- Helical-phase modulation for DNA-encoded qubits [34].
- Spinor projection of genetic code [35].
- Hexagonal-lattice-based superqubit processors [36].
- Phase-entangled gene expression logic in synthetic organisms [37].
- Eulerian circuits for DNA-graph topology routing [38].

Conclusion

Euler's identity serves not only as a unifying concept in mathematics but also as a template for interfacing biological and quantum computation. DNA computers, operating under trigonometric logic, form the base of a multi-phase system that transforms exponentially into quantum AI via hyper-symmetric, superconductive platforms. This model introduces a formal framework for hybrid systems capable of operating across organic and quantum domains.

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