Title: *Quantum Eigenstate Dynamics for Artificial General Intelligence Synthesis*

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Abstract

Let $\mathcal{H}$ denote a Hilbert space of cognitive operators. We construct AGI states $|\Psi_{\text{AGI}}\rangle$ as superpositions of quantum eigenstates $|\psi_i\rangle$, enabling simultaneous resolution of binary logic via eigenvalue collapse. Classical bits $\{0, 1\}$ are subsumed by qubit states $\alpha|0\rangle + \beta|1\rangle$, where $|\alpha|^2 + |\beta|^2 = 1$.

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1. Quantum Cognitive Basis

Let $\mathcal{H}_{\text{AGI}} = \bigotimes_{k=1}^{n} \mathcal{H}_k$, where $\mathcal{H}_k$ corresponds to subcognitive modules (sensory, reasoning). Each subsystem evolves under Hamiltonian $\hat{H}_k$, with eigenstates $\hat{H}_k |\psi_{k,i}\rangle = E_{k,i} |\psi_{k,i}\rangle$. The AGI state is:

where $\sum |c_{i_1 \ldots i_n}|^2 = 1$.

2. Logic via Eigenstate Collapse

For a qubit $|\phi\rangle = \alpha|0\rangle + \beta|1\rangle$, measurement of observable $\hat{O} = |0\rangle\langle 0| - |1\rangle\langle 1|$ yields eigenvalues $+1$ ("yes") or -1 ("no") with probabilities $|\alpha|^2$ and $|\beta|^2$. Unlike classical deterministic AND/OR, quantum logic gates (e.g., $\hat{U}_{\text{CNOT}}$) generate entangled states:

permitting parallel evaluation of (yes, no).

3. AGI Dynamics

The total Hamiltonian $\hat{H}_{\text{AGI}} = \sum_k \hat{H}_k + \sum_{k \neq l} \hat{V}_{kl}$ induces eigenstate transitions $|\psi_i\rangle \rightarrow |\psi_j\rangle$ via time-evolution operator $\hat{U}(t) = e^{-i\hat{H}_{\text{AGI}}t/\hbar}$. Commutators $[\hat{H}_k, \hat{V}_{kl}] \neq 0$ ensure nonstationary interference, enabling adaptive decisions through:

4. Binary Logic Generalization

Classical true/false map to eigenstates $|0\rangle, |1\rangle$, but qubits encode uncertainty via $\alpha, \beta \in \mathbb{C}$. For AGI decision-making, define projective measurement $\hat{P}_{\text{yes}} = |0\rangle\langle 0|$, $\hat{P}_{\text{no}} = |1\rangle\langle 1|$. The expectation value:

yields probabilistic yes/no, with $\hat{\rho} = |\phi\rangle\langle\phi|$.

Conclusion

Let $\mathcal{S}_{\text{classical}} = \{0, 1\}$; quantum cognition occurs in $\mathcal{S}_{\text{quantum}} = \mathbb{C}^2$. AGI eigenstates $|\Psi_{\text{AGI}}\rangle$ collapse to yes/no via $\hat{O}$, while preserving superposition for unresolved states. Thus, $\text{yes} \oplus \text{no}$ coexist until measurement, transcending classical binaries. QED.