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¹ Consciousness as a State of Matter. Max Tegmark. <http://arxiv.org/abs/1401.1219>

² Dept. of Physics & MIT Kavli Institute, Massachusetts Institute of Technology, Cambridge, MA 02139

» [*Consciousness as Integrated Information: a Provisional Manifesto*] [3],

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II. INTEGRATION

A. Our physical world as an object hierarchy

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B. Integration and mutual information

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C. Maximizing integration

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D. Integration, coding theory and error correction

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E. Integration in physical systems

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F. The pros and cons of integration

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G. The integration paradox

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III. INDEPENDENCE

A. Classical versus quantum independence

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B. Canonical transformations, independence and relativity

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C. How integrated can quantum states be?

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D. The quantum integration paradox

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E. How integrated is the Hamiltonian?

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F. Evolution with separable Hamiltonian

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G. The cruelest cut as the maximization of separability

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H. The Hilbert-Schmidt vector space

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I. Separating H with orthogonal projectors

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J. Maximizing separability

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K. The Hamiltonian diagonality theorem

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L. Ultimate independence and the Quantum Zeno paradox

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IV. DYNAMICS AND AUTONOMY

A. Probability velocity and energy coherence

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B. Dynamics versus complexity

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C. Highly autonomous systems: sliding along the diagonal

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D. The exponential growth of autonomy with system size

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E. Boosting autonomy with optimized wave packets

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F. Optimizing autonomy when we can choose the state: factorizable effective theories

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G. Minimizing quantum randomness

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H. Optimizing autonomy when the state is given

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$$\delta H \equiv \sqrt{2tr(\dot{p}^2)}$$

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(?³ , **H₁**), **H₃**

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\mathbf{H}_3

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$$n^2 = 2^{2b} \quad (b)$$

3.

$$\mathbf{U} = e^{i\mathbf{H}t}$$

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3. H

$$H = \int H_r(r) d^3 r; \quad (115)$$

$$H = \sum_i H_i, \quad (115)$$

(115)

H.

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4.

$3=0,$

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IV H,

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5.

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[24, 39].

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H₃

H*

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Appendix A: Useful identities involving tensor products

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Appendix B: Factorization of Harmonic oscillator into uncoupled qubits

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Appendix C: Emergent space and particles from nothing but qubits

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