Quantum chaos transition in a model dual to eternal traversable wormhole

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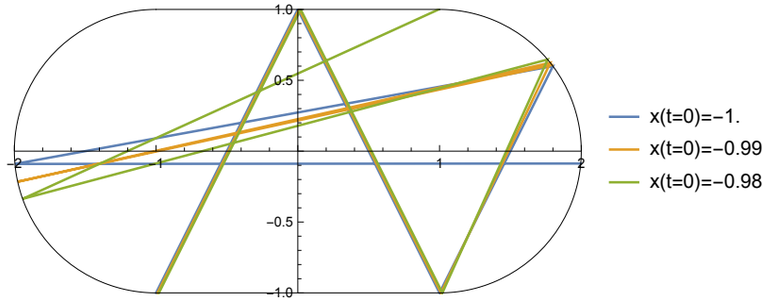
[1804.09934][1901.06031]

Quantum version of chaos is characterized by

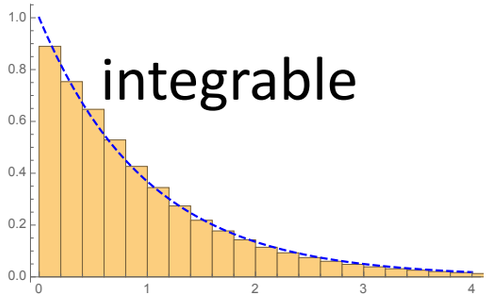


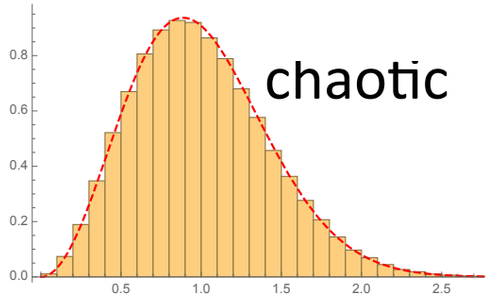
①. Out of Time Ordered Correlator $\langle (i[W(t), V(0)])^2 \rangle \sim e^{\lambda_L t}$

➡ quantum Lyapunov exponent λ_L

②. Random Matrix Theory-likeness of energy spectrum

➡ distribution of $\{E_i - E_{i-1}\}_{i=2}^{\dim \mathcal{H}}$:





(c.f. Tezuka-san's talk on 5/27)

Our question:

When a system shows quantum chaos/integrable transition, what happens in gravity side?

naive guess: "black hole = chaotic" ➡ C/I transition $\overset{?}{=}$ Hawking-Page transition

We elaborate ☐ by studying ② in a deformation of SYK model dual to BH/wormhole.