Τρίτη 12-3-24 Ξεκινάμε στις 5:15

Διάλεξη 4.

- $\Psi(x(t))$ $\qquad$ $\Psi_{1\to 2}$

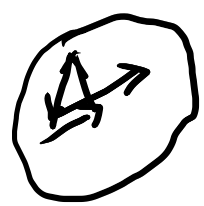
$$\Psi(x(t)) \to e^{iS/\hbar}$$

$$\Psi_{1\to 2} \to \frac{1}{N} \sum_{\substack{\text{όλες} \\ \text{διαδρ.}}} e^{iS/\hbar} \longrightarrow |\Psi_{1\to 2}|^2 = 1$$

$$\Psi(x(t)) \to |\Psi(x(t))|^2 \to \int \rho(x)\, dx = 1$$

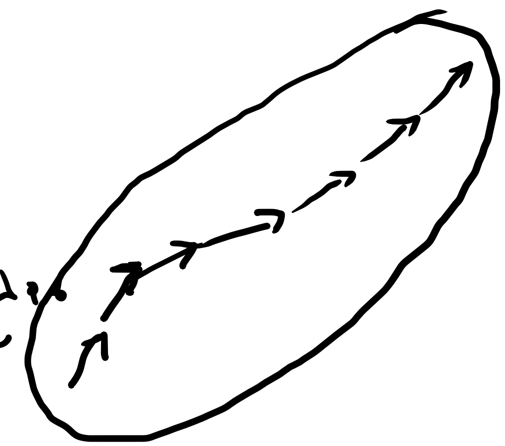
$\Psi_{1\to 2}$

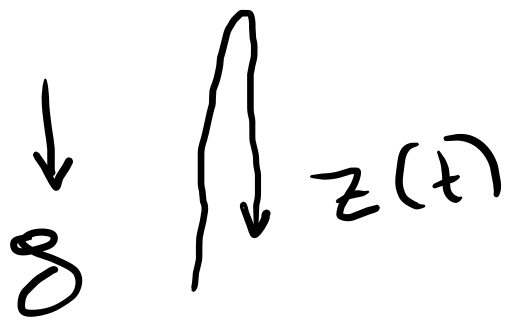
όχι κλ.

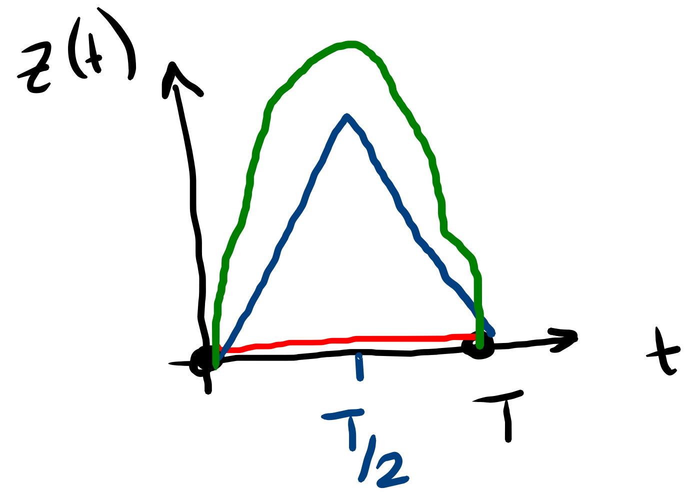


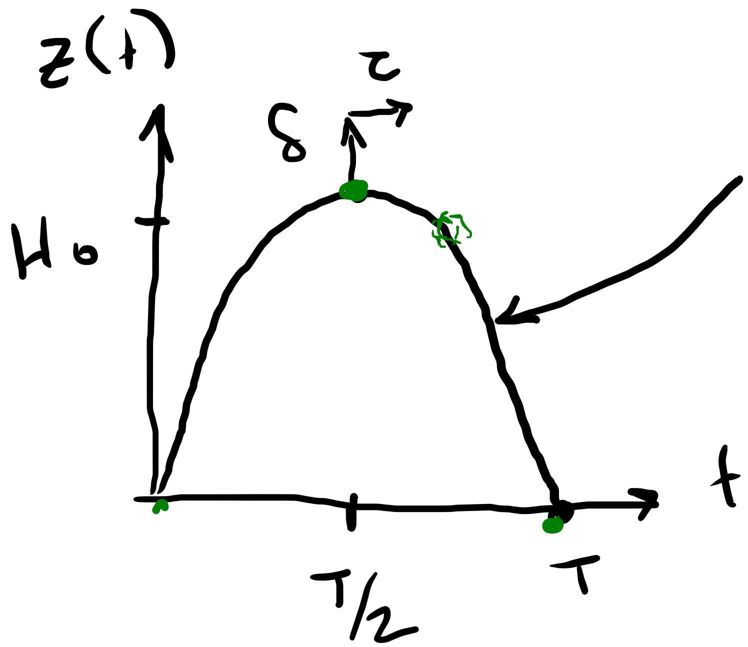
$\Psi_{1\to 2}$

περίπου κλ.



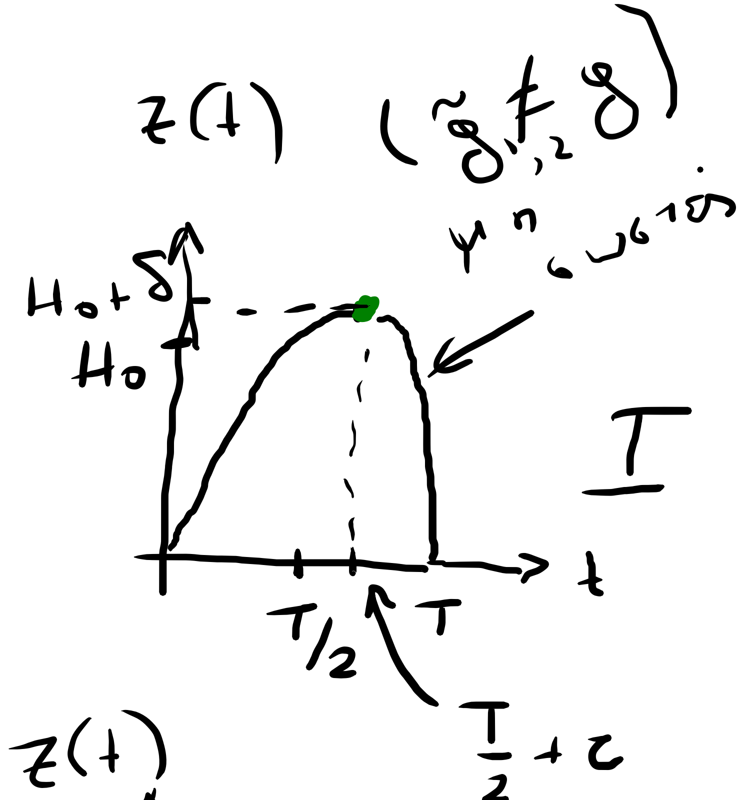


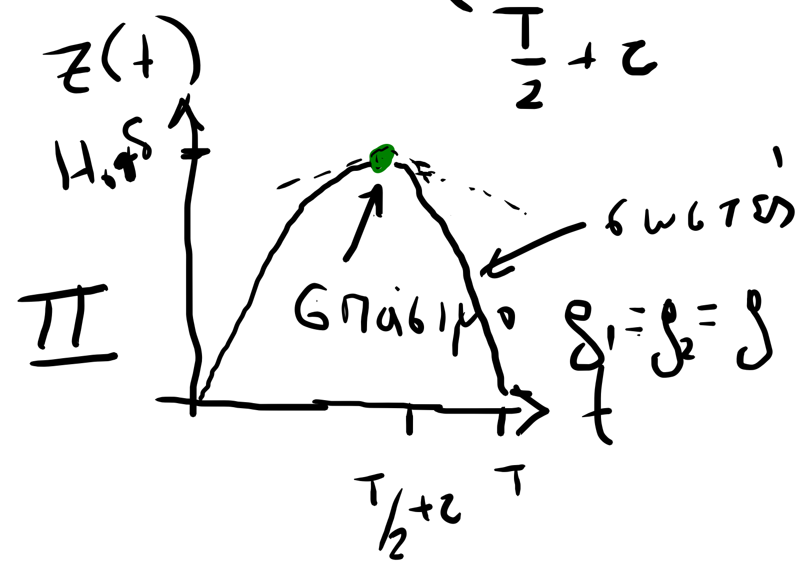




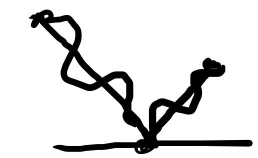
$$z_{\varphi\delta} = \frac{t\,(T-t)}{T^2/4}\;\underbrace{\frac{gT^2}{8}}_{H_0}$$

$$S[\delta,\tau]$$





α) $S_{I}(\delta,\tau) > S_{II}(\delta,\tau)$



επειδή οι 1,2 είναι φυσικές διαδρομές

β) $S_{II}(\delta,\tau) = -\frac{1}{24} m g^2 T^3 + \overset{?}{\alpha}\left(\delta + \frac{1}{2} g \tau^2\right)^2$

θετικός

$\# \frac{m}{T}$

ML^2T^{-1}

εύκολη θεώρηση $\tau = 0$

I) $z_1(t) =$ $\quad z(0) = 0$ ✓ $\quad z(T/2) = H_0 + \delta$

ανόδου

$\dot{z}(T/2) = 0$

$$\alpha t + \beta t^2 \Rightarrow \alpha(T/2) + \beta(T^2/4) = g\frac{T^2}{8} + \delta$$

$$\alpha + 2\beta(T/2) = 0$$

$$\alpha = -\beta T$$

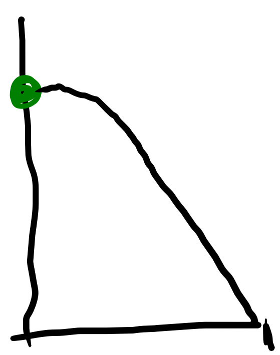
$$-\beta T\left(\frac{T}{2}\right) + \beta\frac{T^2}{4} = g\frac{T^2}{8} + \delta$$

$$\beta = -\frac{gT^2/8 + \delta}{T^2/4} = -\frac{g}{2} + \frac{4\delta}{T^2}$$

$$z_2(t) = H_0 + \delta + \gamma t + \delta t^2$$

$\gamma = 0$

$$\delta = \frac{-4(H_0+\delta)}{T^2}$$



$$z_2(T/2) = 0 \qquad \dot{z}_2(0) = 0$$

$$H_0 + \delta + \cancel{\gamma \frac{T}{2}} + \delta \frac{T^2}{4} = 0$$

$$\gamma + \cancel{2\delta \frac{T}{2}} = 0 \Rightarrow \gamma = -\cancel{\delta T} \ 0$$

$$H_0 + \delta - \cancel{\delta \frac{T^2}{2}} + \delta \frac{T^2}{4} = 0$$

$$H_0 + \delta = -\delta T^2/4 \Rightarrow \delta = -\frac{4(H_0+\delta)}{T^2}$$

$$S(z_1(t)) = \int_0^{T/2} L(z_1, \dot{z}_1) + \int_{T/2 \to 0}^{T \to T/2} L(z_2, \dot{z}_2)$$

$$= \cdots\cdots$$

$$= -\frac{1}{24} m g^2 T^3 + \cdots \delta^2$$

$\underline{\text{II}})$

$$\left.\begin{aligned} z_1(t) &= v_0 t - \frac{1}{2} g t^2 \\ z_1(T/2) &= H_0 + \delta \end{aligned}\right\} \quad v_0 = \dots\dots$$

$$S = 2\int_0^{T/2} L(z_1, \dot{z}_1) = -\frac{1}{24} m g^2 T^3 + \underset{\text{μικρό}}{\text{πιο}}\ \delta^2$$

από το
αντίστοιχο
την $(\underline{\text{I}})$

$\tau \neq 0$

β) $S^{(\delta, T)}_{\varphi.\,\delta\iota\alpha\delta\rho o\mu\underline{\omega\nu}} = -\frac{1}{24}\, m\, g^{2} T^{3} + \underset{?}{\bullet}\left(\delta + \frac{1}{2} g \tau^{2}\right)^{2}$