

D20 (HW 2008 10.1)  
(HW 2009 10.1)

$$\mathcal{H} = \frac{p^2}{2m} + V(x; env) - \frac{1}{m} F(t) \cdot p$$

$$\dot{x} = \frac{\partial \mathcal{H}}{\partial p} = \frac{p - F}{m}$$

(c)

$$\dot{p} = -\frac{\partial \mathcal{H}}{\partial x} = -\frac{\partial V}{\partial x} = (m\ddot{x} + F)$$

נניח כי  $\langle \dots \rangle$  : ערכי תוחלת  
נניח כי  $\langle \dots \rangle$  : ערכי תוחלת

$$\frac{dE}{dt} = \left\langle \frac{d\mathcal{H}}{dt} \right\rangle = \left\langle \underbrace{\frac{\partial \mathcal{H}}{\partial p} \dot{p} + \frac{\partial \mathcal{H}}{\partial x} \dot{x}}_{=0} + \frac{\partial \mathcal{H}}{\partial t} \right\rangle$$

נניח כי  $\langle \dots \rangle = 0$

$$= -\frac{1}{m} \langle p(t) \cdot \dot{F}(t) \rangle$$

$$\left( \begin{aligned} \frac{p}{m} &= \dot{x} + \frac{F}{m} \\ &= v + \frac{F}{m} \end{aligned} \right)$$

$$= -\langle V(t) \rangle \dot{F}(t) - \frac{1}{m} \overline{F(t) \dot{F}(t)}$$

$$\overline{F \dot{F}} = \frac{1}{2} \frac{d}{dt} F^2 = 0$$

$$\frac{i\omega}{4} (f_0 e^{-i\omega t} + f_1^* e^{i\omega t}) (f_0^* e^{i\omega t} - f_0 e^{-i\omega t}) = \frac{i\omega}{4} (|f_0|^2 - |f_0|^2 + f_1^* e^{2i\omega t} - f_0^2 e^{-2i\omega t}) = 0$$

$$= \frac{i\omega}{4} [d_r(\omega) f_0 e^{-i\omega t} + d_r^*(\omega) f_0^* e^{i\omega t}] [f_0 e^{-i\omega t} - f_0^* e^{i\omega t}]$$

$$= \frac{-i\omega}{4} |f_0|^2 [d_r(\omega) - d_r^*(\omega)] = \frac{1}{2} \omega |f_0|^2 \text{Im } d_r(\omega)$$

כחל

$$\frac{x \cdot e^{-x}}{x^2}$$

כח  
↑  
דגבוע

$\langle A(H) \rangle \approx 0$  ని

$$d_v(w)$$

$$\frac{1}{w^2 + y^2} \cdot \frac{1}{m}$$

(Equilibrium)

עצור את הרכבך

(Lecture notes, p. 60)

-e r' r'e

cm of 22/8

2/28

50

FDT

JB