Ενέργειες στην Α.Α.Τ.

Δε 14:12:20

ΔΥΝΑΜΙΚΗ ΕΝΕΡΓΕΙΑ

$U = \frac{1}{2} D \cdot x^2$

$k \to D$ (σταθερά επαναφοράς)

$\Delta L \to x \rightsquigarrow$ x: απόσταση από τη Θ.Ι.

ΤΗΕ Α.Α.Τ.

$x = A \cdot \eta\mu\omega t$

$D = m\omega^2 \Rightarrow U = \frac{1}{2} m\omega^2 A^2 \eta\mu^2\omega t$

$U = \frac{1}{2} D A^2 \cdot \eta\mu^2\omega t \xrightarrow{\eta\mu\omega t = \pm 1} U_{max} = \frac{1}{2} D A^2$

$U = U_{max} \cdot \eta\mu^2\omega t$

Α.Α.Τ.

$K = \frac{1}{2} m v^2 = \frac{1}{2} m\omega^2 A^2 \sigma\upsilon\nu^2\omega t$

$U = \frac{1}{2} D x^2 = \frac{1}{2} m\omega^2 A^2 \cdot \eta\mu^2\omega t$

$+$

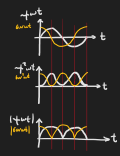
$K + U = \frac{1}{2} m\omega^2 A^2 (\sigma\upsilon\nu^2\omega t + \eta\mu^2\omega t) \Rightarrow$

$\Rightarrow K + U = \frac{1}{2} m\omega^2 A^2$ $= K_{max} = \frac{1}{2} m v_{max}^2$ $= U_{max} = \frac{1}{2} D A^2$

$K = f(t)$ $U = f(t)$ $\neq f(t)$ σταθερή

$K = \frac{1}{2} m v^2 = \underbrace{\frac{1}{2} m\omega^2 A^2}_{K_{max}} \sigma\upsilon\nu^2\omega t = \underbrace{K_{max}}_{E} \cdot \sigma\upsilon\nu^2\omega t \Rightarrow \boxed{K = E \cdot \sigma\upsilon\nu^2\omega t}$

$U = \frac{1}{2} D x^2 = \underbrace{\frac{1}{2} m\omega^2 A^2}_{D} \eta\mu^2\omega t = \underbrace{U_{max}}_{E} \cdot \eta\mu^2\omega t \Rightarrow \boxed{U = E \cdot \eta\mu^2\omega t}$



ΕΝΕΡΓΕΙΑ ΤΑΛΑΝΤΩΣΗΣ

$\boxed{E = K + U}$

$E = U_{max}$ $x = A$ (ΠΕ max) $v = 0$ $(K = 0)$

$E = K_{max}$ $U = 0$ (max) $(K = max)$ $x = 0$ $(U = 0)$

$E = U_{max}$ $x = +A$ $(U = max)$ $U = 0$ $(K = 0)$

$E = K + U = \frac{1}{2} m v^2 + \frac{1}{2} D x^2$

$E = K_{max} = \frac{1}{2} m v_{max}^2$

$E = U_{max} = \frac{1}{2} D A^2$

$\Big\} \Rightarrow E = \frac{1}{2} m\omega^2 A^2$

☺ $E = \frac{1}{2} D A^2$

$K = U$: $E = K + U \Rightarrow$

$\Rightarrow E = U + U \Rightarrow$

$\Rightarrow E = 2U \Rightarrow$

$\Rightarrow U = \frac{E}{2}$

$K = U \Rightarrow K = E/2$

Σε χρόνο T η καθεμία ενέργεια πραγματοποιεί δύο "κύκλους".

$T_K = T_U = \frac{T_{ΑΑΤ}}{2}$

$f_K = f_U = 2 \cdot f_{ΑΑΤ}$

$E = K + U \Rightarrow U_{max} = K + U \Rightarrow \frac{1}{2} D A^2 = \frac{1}{2} m v^2 + \frac{1}{2} D x^2 \Rightarrow$

$\Rightarrow m\omega^2 A^2 = m v^2 + m\omega^2 x^2 \Rightarrow v^2 = \omega^2 A^2 - \omega^2 x^2 \Rightarrow$

$\Rightarrow v^2 = \omega^2 (A^2 - x^2) \Rightarrow \boxed{v = \pm\omega\sqrt{A^2 - x^2}}$

Θ.Α