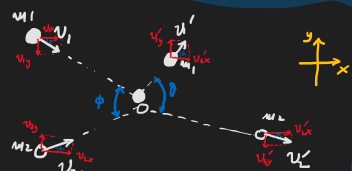
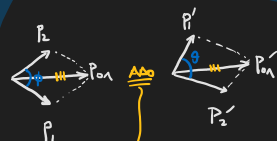


ΠΛΑΓΙΕΣ ΚΡΟΥΣΕΙΣ



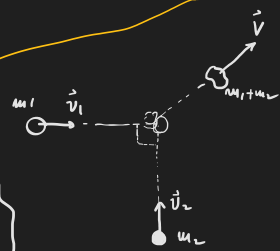
ΑΔΟ-χ: $m_1 u_{1x} + m_2 u_{2x} = m_1 v_{1x} + m_2 v_{2x}$

ΑΔΟ-υ: $-m_1 u_{1y} + m_2 u_{2y} = -m_1 v_{1y} - m_2 v_{2y}$



$p_{0x} = p_{0x}' \Rightarrow \sqrt{p_1^2 + p_2^2 + 2p_1 p_2 \cos \phi} = \sqrt{p_1'^2 + p_2'^2 + 2p_1' p_2' \cos \theta}$

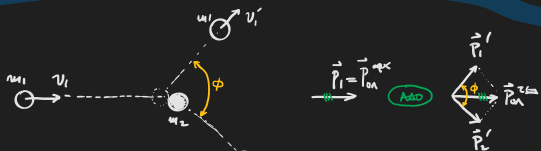
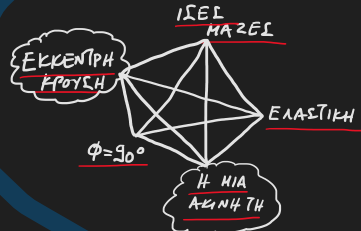
$p_1 = m_1 u_1$ $p_1' = m_1 v_1'$
 $p_2 = m_2 u_2$ $p_2' = m_2 v_2'$



$m_1 = 2 \text{ kg}$
 $m_2 = 4 \text{ kg}$
 $u_1 = 10 \text{ m/s}$
 $u_2 = 8 \text{ m/s}$
 $u_1 \perp u_2$
 ΠΛΑΓΙΑ ΚΡΟΥΣΗ

$\vec{p}_1 + \vec{p}_2 \stackrel{\text{ΑΔΟ}}{=} \vec{p}_{\text{συσ}}$
 $\sqrt{p_1^2 + p_2^2} = p_{\text{συσ}}$
 $\sqrt{m_1^2 u_1^2 + m_2^2 u_2^2} = (m_1 + m_2) V$
 $\sqrt{2^2 \cdot 10^2 + 4^2 \cdot 8^2} = (2+4) V$
 $V = 6,29 \text{ m/s}$

$\Delta K = K_{\text{αφ'εξ}} - K_{\text{πρ'εξ}} =$
 $= \frac{1}{2} (m_1 + m_2) V^2 - \left(\frac{1}{2} m_1 u_1^2 + \frac{1}{2} m_2 u_2^2 \right) =$
 $= \dots = -20 \text{ J}$
 Ζε - "θέρμανση αλληλεπίδρασης"



ΑΔΟ: $\vec{p}_{0x} = \vec{p}_{0x}' \Rightarrow \vec{p}_1 = \vec{p}_1' + \vec{p}_2' \Rightarrow p_1 = \sqrt{p_1'^2 + p_2'^2 + 2p_1' p_2' \cos \phi} \Rightarrow$

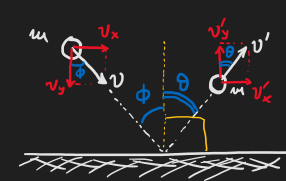
$\Rightarrow p_1^2 = p_1'^2 + p_2'^2 + 2p_1' p_2' \cos \phi \xrightarrow{m_1 = m_2} u_1^2 = u_1'^2 + u_2'^2 + 2u_1' u_2' \cos \phi \Rightarrow$

$\Rightarrow u_1^2 = u_1'^2 + u_2'^2 + 2u_1' u_2' \cos \phi \quad (1)$

ΕΛΑΣΤΙΚΗ: $K_{\text{αφ'εξ}} = K_{\text{πρ'εξ}} \Rightarrow$
 $K_1 = K_1' + K_2' \xrightarrow{u_1 = u_2}$
 $\frac{1}{2} m u_1^2 = \frac{1}{2} m u_1'^2 + \frac{1}{2} m u_2'^2 \Rightarrow$
 $u_1^2 = u_1'^2 + u_2'^2 \quad (2)$

(1)/(2): $\cancel{u_1^2} + u_2'^2 = \cancel{u_1'^2} + u_2'^2 + 2u_1' u_2' \cos \phi \Rightarrow$
 $\Rightarrow 2u_1' u_2' \cos \phi = 0 \xrightarrow{u_2' \neq 0} \cos \phi = 0 \Rightarrow \phi = 90^\circ$

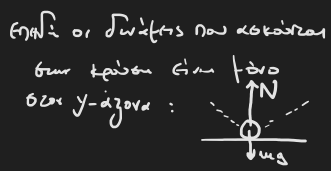
Νόμος της αντίδρασης του Newton



Συντηρητική κρούση στο έδαφος:

$K_{\text{αφ'εξ}} = K_{\text{πρ'εξ}}$
 $\frac{1}{2} m u^2 = \frac{1}{2} m u'^2$

$u = u' \quad \text{ΚΑΤΑ ΜΕΤΡΟ}$



Επειδή οι δυνάμεις που ασκούνται
 είναι ίσες και αντίθετες
 τότε γ-άξονα:

Έχω $\sum F_x = 0 \Rightarrow$ ΑΔΟ-χ:

$p_x = p_x' \Rightarrow$

$m u_x = m v_x' \Rightarrow$

$u \cdot \phi = v' \cdot \theta \Rightarrow$

$\Rightarrow \phi = \theta \quad \phi < 90^\circ$

η συνιστώσα πρόσπτωσης (φ)
 ίση με τη συνιστώσα
 ανακλάσεως (θ)
 Νόμος της Αντίδρασης
 του Newton