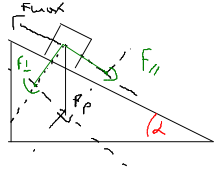
$m = 2{,}0\,kg$

$\alpha = ?$

$k = 200\ N/m$



$\mu_1 = 0{,}75$

$F_{max} = F_{//}$

$F_\perp \cdot \mu_1 = F_{//}$

$(\cos\alpha)^2 + (\operatorname{sen}\alpha)^2 = 1$

$\cos^2\alpha + \operatorname{sen}^2\alpha = 1$

$F_P \cdot \cos\alpha \cdot \mu_1 = F_{//P} \cdot \sqrt{1-(\cos\alpha)^2}$

$(\cos\alpha \cdot \mu_1)^2 = 1-(\cos\alpha)^2$

$\cos^2\alpha \cdot \mu_1^2 = 1 - \cos^2\alpha$

$\cos^2\alpha \cdot \mu_1^2 + \cos^2\alpha = 1$

$\cos^2\alpha(\mu_1^2 + 1) = 1$

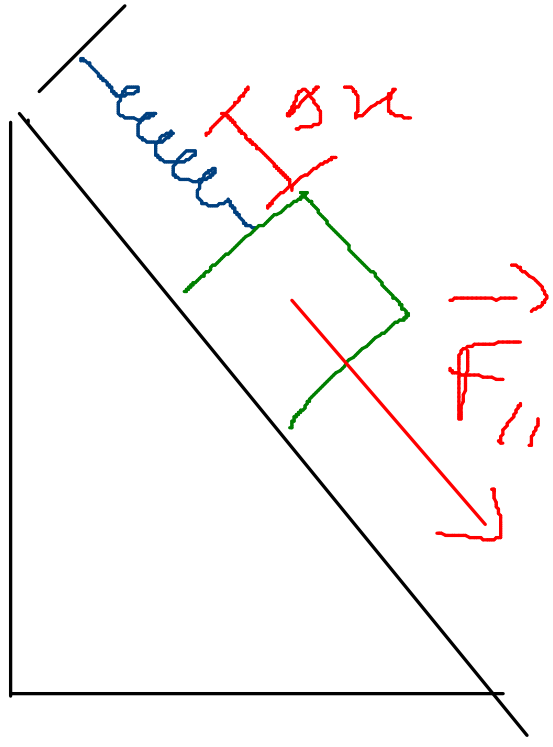
$\cos^2\alpha = \dfrac{1}{(\mu_1^2+1)}$

$\cos\alpha = \sqrt{\dfrac{1}{(\mu_1^2+1)}}$

$\cos\alpha = \sqrt{\dfrac{1}{(0{,}75)^2+1}} = 0{,}8$

$\alpha = \arccos(0{,}8) = 36{,}9^\circ$

$$\cos \alpha_{max} = \frac{1}{\sqrt{1+\mu_s^2}} \qquad \alpha = 2\alpha_{max} =$$



$$F_{11} = F_p \operatorname{sen} \alpha$$

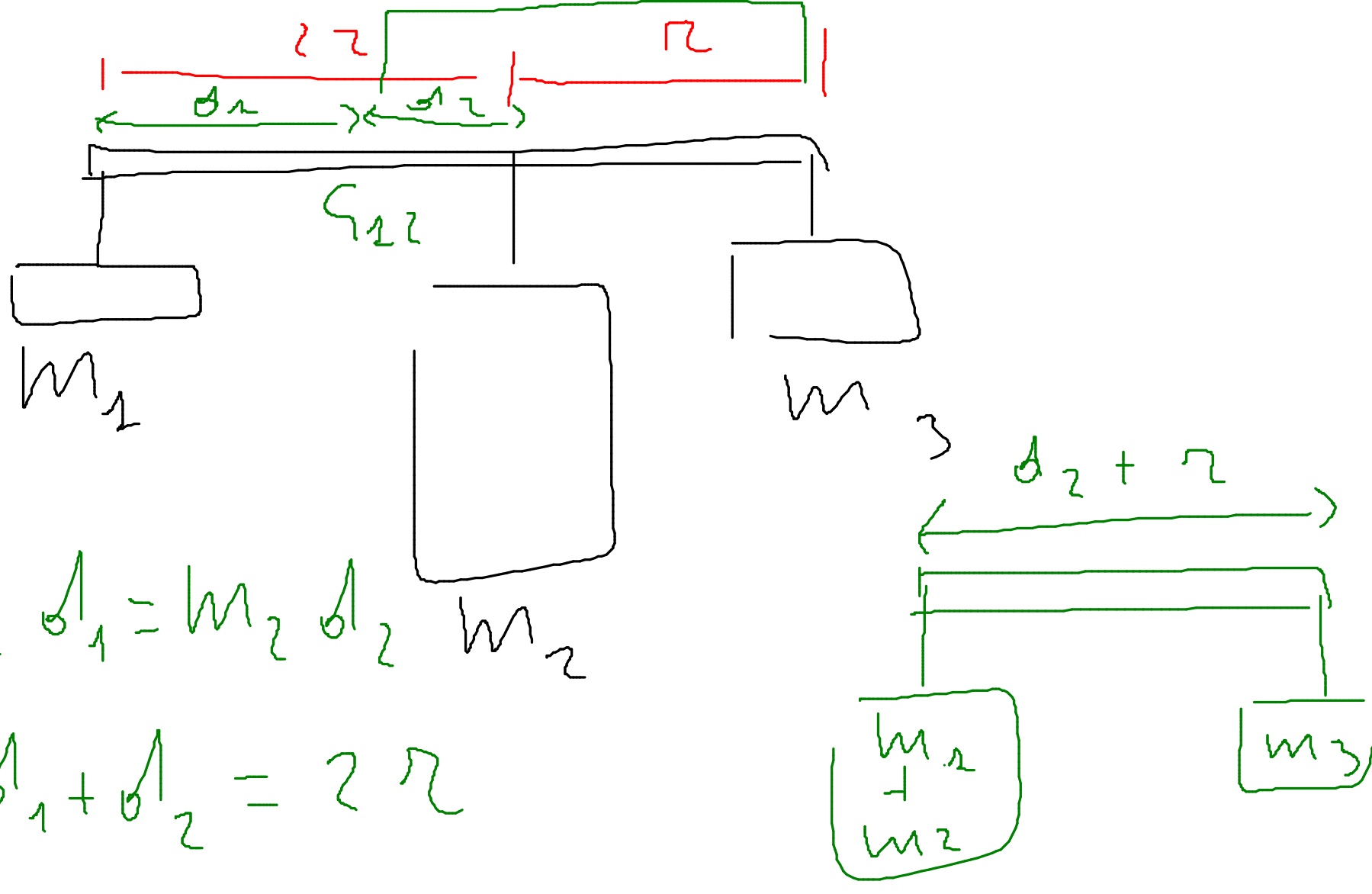
$$F_{11} = F_e$$

$$F_p \operatorname{sen} \alpha = k \Delta x$$

$$\Delta x = \frac{F_p \operatorname{sen} \alpha}{k} = \frac{2{,}0\,\text{kg} \cdot 9{,}8\,\frac{\text{N}}{\text{kg}}}{200\,\text{N/m}} \operatorname{sen} \alpha$$

$$\Delta x = \frac{2,0 \cdot 9,8}{200} \operatorname{sen} 73,8^{\circ} \; m$$

$$= 0,094 \; m = 9,4 \; cm$$



$$m_1 d_1 = m_2 d_2$$

$$d_1 + d_2 = 2r$$