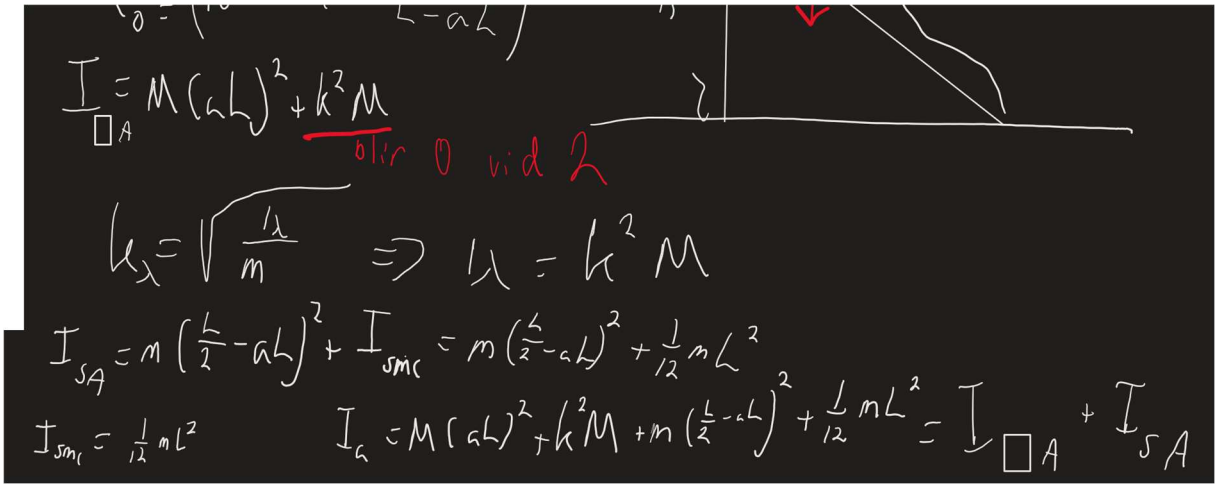
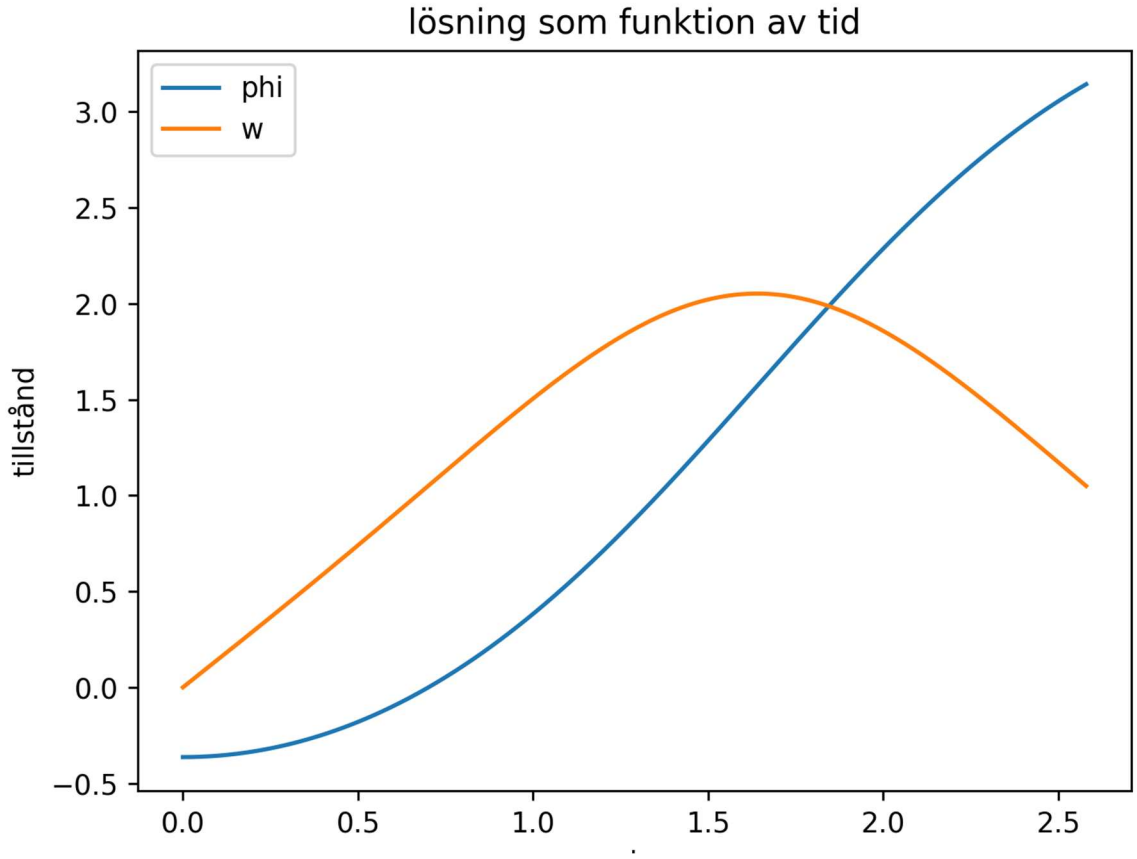
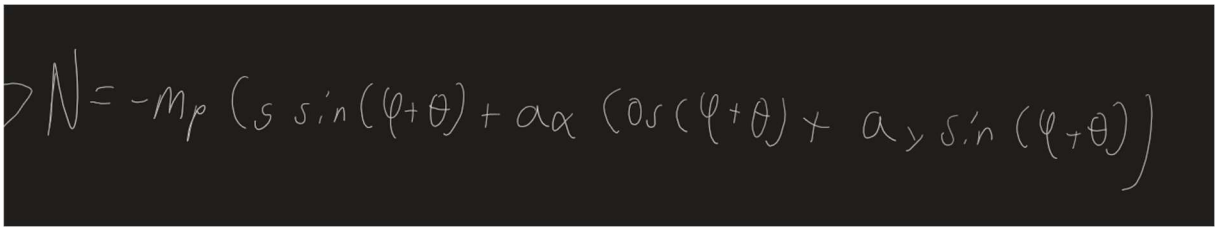
1.


$I_{\square A} = M(aL)^2 + k^2 M$
blir 0 vid 2
$k_\lambda = \sqrt{\frac{I_\lambda}{m}} \Rightarrow I_\lambda = k^2 M$
$I_{SA} = m\left(\frac{L}{2} - aL\right)^2 + I_{Smc} = m\left(\frac{L}{2} - aL\right)^2 + \frac{1}{12} mL^2$
$I_{Smc} = \frac{1}{12} mL^2$
$I_a = M(aL)^2 + k^2 M + m\left(\frac{L}{2} - aL\right)^2 + \frac{1}{12} mL^2 = I_{\square A} + I_{SA}$


lösning som funktion av tid
phi
w
tillstånd
3.0
2.5
2.0
1.5
1.0
0.5
0.0
−0.5
0.0
0.5
1.0
1.5
2.0
2.5


$N = -m_p (s \sin(\varphi+\theta) + a_x \cos(\varphi+\theta) + a_y \sin(\varphi+\theta))$

$$p_x = (L - aL)\cos(\varphi) + l\cos(\varphi + \theta)$$

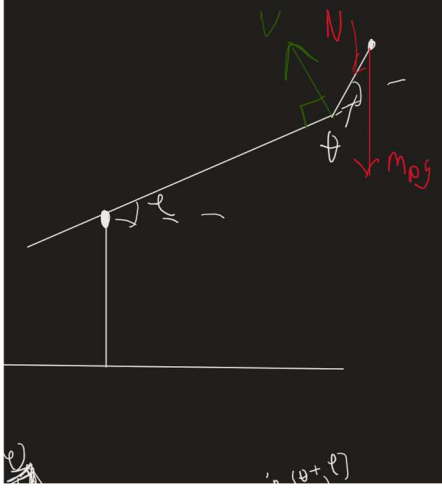
$$p_y = (L - aL)\sin(\varphi) + l\sin(\varphi + \theta)$$

$$V_x = (a-1)L\sin(\varphi)\dot{\varphi} - l(\dot{\theta} + \dot{\varphi})\sin(\varphi + \theta)$$

$V_y =$ (a - 1) L cos(ϕ(t)) ϕ'(t) + (θ'(t) + ϕ'(t)) cos(ϕ(t) + θ(t))

$a_x =$ (a - 1) L (cos(ϕ(t)) ϕ'(t)^2 + sin(ϕ(t)) ϕ''(t)) - l (θ'(t) + ϕ'(t))^2 cos(ϕ(t) + θ(t)) - l sin(ϕ(t) + θ(t)) (θ''(t) + ϕ''(t))

$a_y =$ (a - 1) L (cos(ϕ(t)) ϕ''(t) - sin(ϕ(t)) ϕ'(t)^2) + (θ'(t) + ϕ'(t))^2 (-sin(ϕ(t) + θ(t))) + cos(ϕ(t) + θ(t)) (θ''(t) + ϕ''(t))



$$\uparrow: -m_p g - N\sin(\varphi + \theta) = m_p a_y$$

$$\rightarrow = -N\cos(\varphi + \theta) = m_p a_x$$

$$F = M a = \frac{G}{\rho} m_p$$

$$u = \begin{bmatrix} \varphi \\ \theta \end{bmatrix} \Rightarrow \dot{u} = \begin{bmatrix} \dot{\varphi} \\ \dot{\theta} \end{bmatrix} = \begin{bmatrix} u_2 \\ \sum_{i=1}^{n} \frac{m}{i} \end{bmatrix}$$

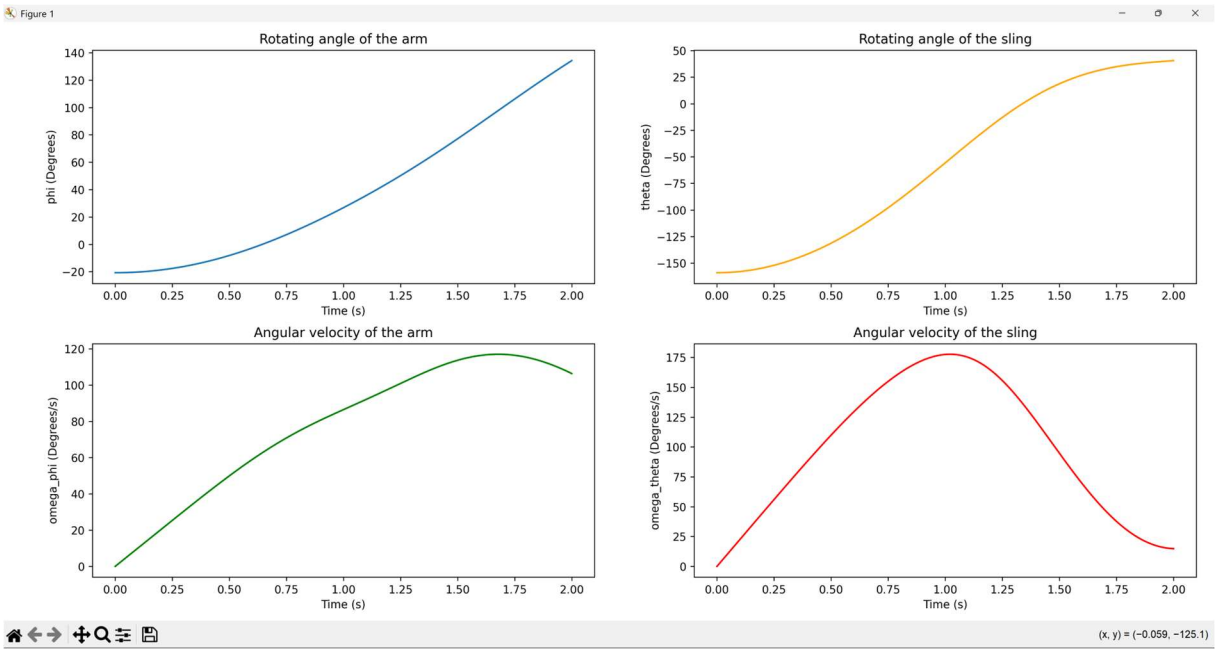
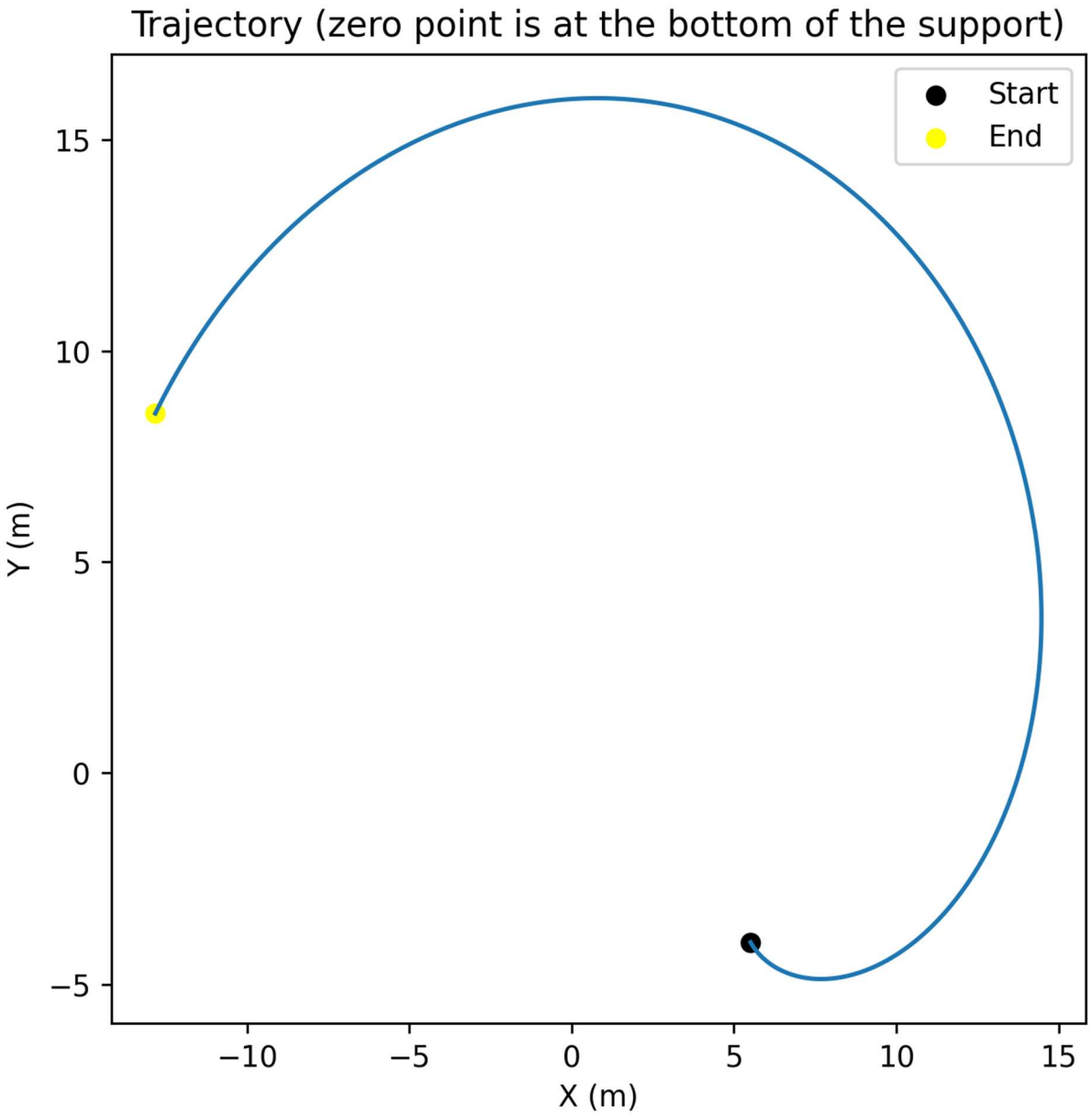


Figure 1
Rotating angle of the arm
phi (Degrees)
Time (s)
Rotating angle of the sling
theta (Degrees)
Time (s)
Angular velocity of the arm
omega_phi (Degrees/s)
Time (s)
Angular velocity of the sling
omega_theta (Degrees/s)
Time (s)
(x, y) = (−0.059, −125.1)


Trajectory (zero point is at the bottom of the support)
Start
End
Y (m)
X (m)