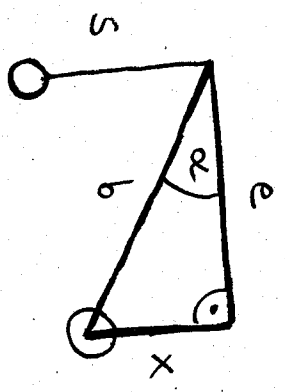


a) Kinematik



Seillänge: $l = s + b$

s gilt
 $b = \sqrt{e^2 + x^2}$

$$\Rightarrow s = l - \sqrt{e^2 + x^2}$$

$$\tan \alpha = \frac{x}{e} \Rightarrow \alpha = \arctan \frac{x}{e}$$

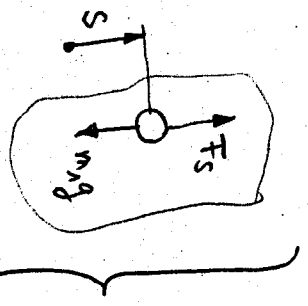
b) $x(t) = vt$

$$\Rightarrow s(t) = l - \sqrt{e^2 + v^2 t^2}$$

$$\dot{s}(t) = - \frac{2v^2 t}{2\sqrt{e^2 + v^2 t^2}}$$

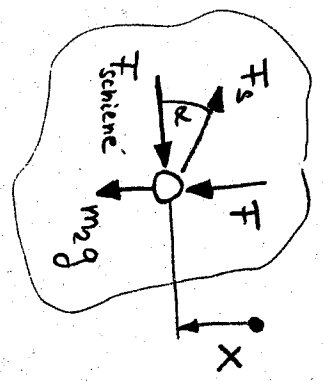
$$\ddot{s}(t) = - \frac{v^2 \sqrt{e^2 + v^2 t^2} - 8v^2 t \cdot \frac{2v^2 t}{2\sqrt{e^2 + v^2 t^2}}}{e^2 + v^2 t^2}$$

c) Masse 1



$$m_1 \ddot{s} = F_s - m_1 g$$

Masse 2



$$m_2 \ddot{x} = m_2 g + F - F_s \sin \alpha$$

Ineinander eingesetzt:

$$0 = m_2 g + F - (m_1 \ddot{s} + m_1 g) \sin \alpha$$

$$\Rightarrow F(t) = m_1 (\ddot{s} + g) \sin \alpha - m_2 g$$

mit $\ddot{s}(t)$ siehe b

und $\sin \alpha(t) = \frac{x(t)/e}{\sqrt{1 + (x(t)/e)^2}}$

$$v(t) = vt$$