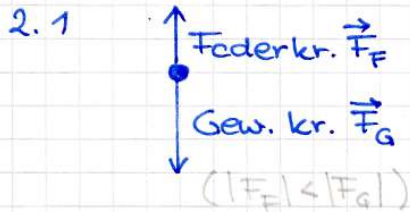


AD 1996 - A III

2.0 Geg:  $l_0 = 6,0 \text{ cm}$  ;  $A = 4,0 \text{ cm}$



2.2 Im Gleichgewicht:  $F_F = F_G$   
 $\Rightarrow D l_0 = mg$   
 $F_{\text{rel}} = F_F - F_G$   
 $= D(l_0 - s) - mg$   
 $= D l_0 - Ds - mg$

$F_{\text{rel}} = -Ds$

2.3  $F_{\text{rel}} = -Ds = ma = m\ddot{s} = -m\omega^2 \cdot s$

Also:  $Ds = m\omega^2 s \Rightarrow D = m\omega^2 = m \cdot \frac{4\pi^2}{T^2}$

$\Leftrightarrow$   $T = 2\pi \sqrt{\frac{m}{D}}$

2.4  $T = 2\pi \sqrt{\frac{m}{D}} = 2\pi \sqrt{\frac{m}{\frac{mg}{l_0}}} = 2\pi \sqrt{\frac{l_0}{g}}$  ;  $D = \frac{mg}{l_0}$

$T = 2\pi \sqrt{\frac{6,0 \cdot 10^{-2} \text{ m}}{9,81 \text{ m/s}^2}} = \underline{0,49 \text{ s}}$

2.5  $s(t) = A \cdot \cos(\omega t)$

$= A \cdot \cos\left(\frac{2\pi}{T} \cdot t\right)$

$= \underline{4,0 \text{ cm} \cdot \cos\left(\frac{2\pi}{0,49 \text{ s}} \cdot t\right)}$  ← besser für spätere Berechnungen

$= \underline{4,0 \text{ cm} \cdot \cos(135^\circ \cdot t)}$

2.6  $s(t) = -3,0 \text{ cm}$

$-3,0 \text{ cm} = 4,0 \text{ cm} \cdot \cos(\omega t)$

$\Leftrightarrow \cos(\omega t) = -0,75$

$t_{\text{TR}} = \frac{\cos^{-1}(-0,75)}{2\pi/0,49 \text{ s}} = \frac{0,49 \text{ s} \cdot \cos^{-1}(-0,75)}{2\pi} = 0,189 \text{ s}$

$t = 0,19 \text{ s}$