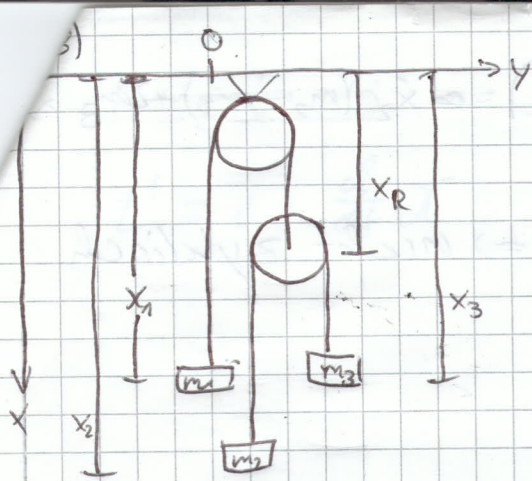


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$$z_1 = z_2 = z_3 = z_R = 0 \quad \checkmark$$

$$y_1 = 0 \quad y_2 = R \quad y_R = 2R \quad y_3 = 3R \quad \left. \begin{array}{l} \\ \\ \\ \end{array} \right\} 12 - 10 = 2 \text{ Freiheitsgrade}$$

$$x_1 + x_R = \text{const}$$

$$x_2 + x_3 - 2x_R = \text{const}$$

$$q_1 = x_1 \quad q_2 = x_2$$

war hier nicht gefordert, ist aber richtig

$$x_R = C_1 - x_1 \quad \checkmark$$

$$x_3 = C_2 - x_2 + 2(C_1 - x_1) = \underbrace{C_2 + 2C_1}_C - (x_2 + 2x_1) \quad \checkmark$$

$$\Rightarrow T = \frac{1}{2} (m_1 \dot{x}_1^2 + m_2 \dot{x}_2^2 + m_3 (\dot{x}_2 + 2\dot{x}_1)^2) \quad \checkmark$$

$$V = mg (m_1 x_1 + m_2 x_2 + m_3 (C - (x_2 + 2x_1))) \quad \checkmark$$

$$L = \frac{1}{2} (m_1 \dot{x}_1^2 + m_2 \dot{x}_2^2 + m_3 (\dot{x}_2^2 + 4\dot{x}_1 \dot{x}_2 + 4\dot{x}_1^2)) - g(m_1 x_1 + m_2 x_2 + m_3 (C - x_2 - 2x_1)) \quad \checkmark$$

$$p_1 = \frac{\partial L}{\partial \dot{x}_1} = m_1 \dot{x}_1 + m_3 (2\dot{x}_2 + 4\dot{x}_1) = \dot{x}_1 (m_1 + 4m_3) + 2m_3 \dot{x}_2 \quad \checkmark$$

$$\frac{\partial L}{\partial x_1} = -g(m_1 - 2m_3) \neq 0 \Rightarrow \text{nicht zyklisch} \quad \checkmark$$

$$\frac{d}{dt} p_1 - \frac{\partial L}{\partial x_1} = 0$$

$$\Leftrightarrow \frac{1}{m_1 + 4m_3} \ddot{x}_1 + \frac{2m_3}{m_1 + 4m_3} \ddot{x}_2 - g \frac{2m_3 - m_1}{m_1 + 4m_3} = 0 \quad \checkmark$$