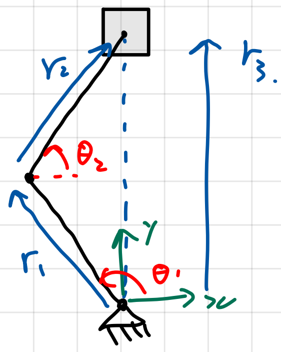


$$r_3 = r_1 + r_2.$$
$$= l e^{i\theta_1} + l e^{i\theta_2}$$
$$0 = l\cos\theta_1 + l\cos\theta_2.$$
$$L_3 = l\sin\theta_1 + l\sin\theta_2$$
$$\theta_1 = \cos^{-1}(-\cos\theta_2)$$
$$L_3 = l\sin\left(\cos^{-1}(-\cos\theta_2)\right) + l\sin\theta_2$$
$$\cancel{l}\dot\theta_1\sin\theta_1 + \cancel{l}\dot\theta_2\sin\theta_2 = 0$$
$$\dot\theta_1 = -\frac{\sin\theta_2}{\sin\theta_1}\dot\theta_2$$
$$\dot L_3 = l\dot\theta_1\cos\theta_1 + l\dot\theta_2\cos\theta_2$$
$$\dot L_3 = -l\frac{\sin\theta_2\cos\theta_2}{\sin\left(\cos^{-1}(-\cos\theta_2)\right)}\dot\theta_2 + l\dot\theta_2\cos\theta_2.$$
$$\boxed{\frac{\dot\theta_2}{\dot L_3} = \frac{1}{-l\frac{\sin\theta_2\cos\theta_2}{\sin(\cos^{-1}(-\cos\theta_2))} + l\cos\theta_2.}}$$
$$\frac{\dot\theta_1}{\dot L_3} = -\frac{\sin\theta_1}{\sin\theta_2}\cdot\frac{1}{-l\frac{\sin\theta_2\cos\theta_2}{\sin(\cos^{-1}(-\cos\theta_2))} + l\cos\theta_2}$$
$$\boxed{\frac{\dot\theta}{\dot L_3} = \frac{\sin(\cos^{-1}(-\cos\theta_2)).}{\frac{l\sin^2\theta_2\cos\theta_2}{\sin(\cos^{-1}(-\cos\theta_2))} - l\cos\theta_2\sin\theta_2}}$$

Force deflection analysis.

$$\phi_1 = \theta_1 - \theta_{10}. \quad \phi_2 = (\theta_1 - \theta_{1.0}) - (\theta_2 - \theta_{2.0}) \quad \phi_3 = (\theta_2 - \theta_{2.0})$$
$$\partial\phi_1 = \partial\theta_1 \quad \partial\phi_2 = \partial\theta_1 - \partial\theta_2 \quad \partial\phi_3 = \partial\theta$$
$$F_{in}\cdot\partial L_3 = T_1\partial\phi_1 + T_2\partial\phi_2 + T_3\partial\phi_3$$
$$= K_1\phi_1\partial\phi_1 + K_2\phi_2\partial\phi_2 + K_3\phi_3\partial\phi_3$$
$$F_{in} = K_1\phi_1\frac{\partial\phi_1}{\partial L} + K_2\phi_2\frac{\partial\phi_2}{\partial L} + K_3\phi_3\frac{\partial\phi_3}{\partial L}.$$
$$= K_1\phi_1\frac{\partial\theta_1}{\partial L_3} + K_2\phi_2\left(\frac{\partial\theta_1}{\partial L_3} - \frac{\partial\theta_2}{\partial L_3}\right) + K_3\phi_3\frac{\partial\theta_2}{\partial L_3}$$
$$\theta_{1.0} = \theta_{2.0} = \frac{\pi}{2}.$$