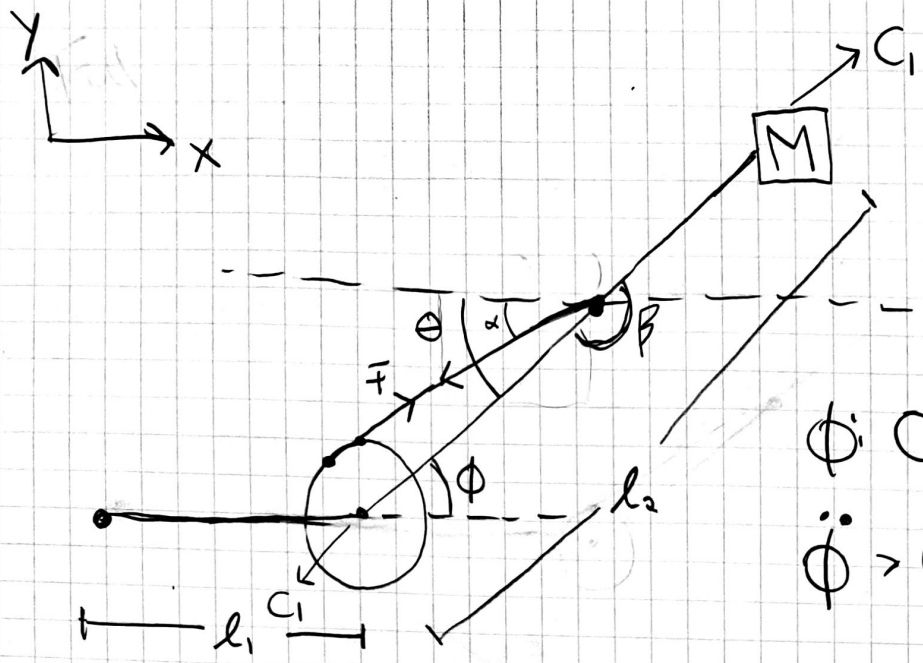


ϕ: $0° \leftrightarrow 90°$

$\dot{\phi} > 0$

Assume full constant hip extension

$(\beta = 180°)$

$x_m = l_1 + l_2\cos\phi \qquad y_m = l_2\sin\phi$

$\dot{x}_m = -l_2\sin\phi\cdot\dot{\phi} \qquad \dot{y}_m = l_2\cos\phi\,\dot{\phi}$

$\ddot{x}_m = -l_2\cos\phi\,\dot{\phi}^2 \qquad \ddot{y}_m = -l_2\sin\phi\,\dot{\phi}^2$

$M\ddot{x}_m = C_1\cos\phi - F\cos\alpha \rightarrow C_1 = \dfrac{F\cos\alpha + M\ddot{x}_m}{\cos\phi}$

$M\ddot{y}_m = C_1\sin\phi - F\sin\alpha - Mg$

$\hookrightarrow M\ddot{y}_m = \left(\dfrac{F\cos\alpha + M\ddot{x}_m}{\cos\phi}\right)\sin\phi - F\sin\alpha - Mg$

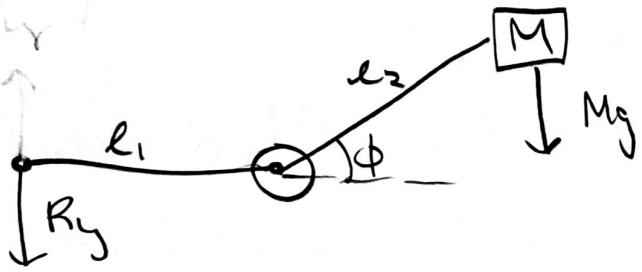
$-Ml_2\sin\phi\,\dot{\phi}^2 = \tan\phi(F\cos\alpha - Ml_2\sin\phi\,\dot{\phi}^2) - F\sin\alpha - Mg$

$Ml_2\sin\phi\,\dot{\phi}^2(\tan\phi - 1) + Mg = F(\cos\alpha\tan\phi - \sin\alpha)$

Questions:

* Even if ϕ is static, does hip flexion lengthen the hamstring & change F?
* Finding F using R_y at ankle? Data Given from N.bord

↳



$$\Sigma M_{knee} = 0 = -Mg\,\ell_2\cos\phi + \ell_1 R_y$$

$$\left[R_y = \frac{\ell_2\cos\phi}{\ell_1} Mg\right]$$