$$\Rightarrow \begin{cases} m\dot{x}_m + M\dot{x}_M = 0 \\ m\ddot{x}_m + M\ddot{x}_M = 0 \\ M\dot{x}_M\ddot{x}_M + m\dot{x}_m\ddot{x}_m + m\dot{y}_m\ddot{y}_m + mg\dot{y}_m = 0 \\ \dot{y}_m = tg\alpha\,(\dot{x}_M - \dot{x}_m) \\ \ddot{y}_m = tg\alpha\,(\ddot{x}_M - \ddot{x}_m) \end{cases}$$

Scrivo tutto in funzione di $\ddot{x}_M$ e $\dot{x}_M$:

$$\dot{x}_m = -\frac{M}{m}\dot{x}_M$$

$$\ddot{x}_m = -\frac{M}{m}\ddot{x}_M$$

$$\dot{y}_m = tg\alpha\;\dot{x}_M\left(1+\frac{M}{m}\right)$$

$$\ddot{y}_m = tg\alpha\;\ddot{x}_M\left(1+\frac{M}{m}\right)$$

$$M\cancel{\dot{x}_M}\ddot{x}_M + m\left(\frac{M}{m}\right)^2\cancel{\dot{x}_M}\ddot{x}_M + m\left(1+\frac{M}{m}\right)^2 tg^2\alpha\,\cancel{\dot{x}_M}\ddot{x}_M$$
$$+\,mg\,tg\alpha\,\cancel{\dot{x}_M}\left(1+\frac{M}{m}\right) = 0$$

$$\ddot{x}_M\left(M + \frac{M^2}{m} + \frac{(m+M)^2}{m}tg^2\alpha\right) = -mg\,tg\alpha\,\frac{m+M}{m}$$

$$\ddot{x}_M\,\cancel{\frac{(m+M)}{m}}\,\left(M + (m+M)\,tg^2\alpha\right) = -m\,g\,tg\alpha\,\cancel{\frac{m+M}{m}}$$

$$\ddot{x}_M\;\frac{M\cos^2\alpha + m\sin^2\alpha + M\sin^2\alpha}{\cos^{\cancel{2}}\alpha} = -mg\,\frac{\sin\alpha}{\cancel{\cos\alpha}}$$

$$\ddot{x}_M = -\frac{m\,g\,\sin\alpha\cos\alpha}{M + m\sin^2\alpha} \leftarrow$$ stessa espressione di A (come deve essere)