EX. DE 17/09 - MODELAGEM

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(1.) $f(x) = \cos 2x$

$f^{*}(x) = \cos \bar{x} - \operatorname{sen} \bar{x}\,(x - \bar{x})$

$\begin{cases} \bar{x} = 0 \Rightarrow \cos 2x = 1 \\ \bar{x} = \frac{\pi}{4} \Rightarrow \cos 2x = \frac{\sqrt{2}}{2} - \frac{\sqrt{2}}{2}\left(x - \frac{\pi}{4}\right) \end{cases}$

(2.) $m\dot{v} = F - mrU + mx\dot{r} \Rightarrow F = m\dot{v} + mrU - mx\dot{r}$

SENDO: $\dot{\bar{v}} = \bar{r} = \bar{v} = 0$

$$f(x,U,r,\dot{r},\dot{v}) = f(\bar{x},\bar{U},\bar{r},\dot{\bar{r}},\bar{v}) + \frac{\partial f}{\partial x}(x-\bar{x}) + \frac{\partial f}{\partial U}(U-\bar{U}) + \frac{\partial f}{\partial r}(r-\bar{r}) + \frac{\partial f}{\partial \dot{r}}(\dot{r}-\dot{\bar{r}}) + \frac{\partial f}{\partial \dot{v}}(\dot{v}-\bar{v})$$

$$f(x,U,r,\dot{r},\dot{v}) = \cancel{m\bar{v}} + \cancel{m\dot{\bar{r}}U} - \cancel{m\bar{x}\dot{\bar{r}}} - \cancel{m\dot{\bar{r}}(x-\bar{x})} + \cancel{m\bar{r}(U-\bar{U})} + m\bar{U}(r-\cancel{\bar{r}}) - m\bar{x}(\dot{r}-\cancel{\dot{\bar{r}}}) + m(\dot{v}-\cancel{\dot{\bar{v}}})$$

$$\underbrace{f(x,U,r,\dot{r},\dot{v})}_{F} = m\bar{U}r - m\bar{x}\dot{r} + m\dot{v}$$

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