PME 3380 - Modelagem

Exercício (17/09) - Sistemas Fluídicos - Linearização

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- $f(\theta) = \cos\theta$

- $\theta_0 = 0$

$$\cos\theta = \cos\theta_0 \cdot \left.\frac{\partial \cos\theta}{\partial\theta}\right|_{\theta_0} (\theta - \theta_0) \Rightarrow \cos\theta = \cos 0 - \operatorname{sen} 0\,(\theta - 0) = 1$$

- $\theta_0 = \pi/4$

$$\cos\theta = \cos\theta_0 \cdot \left.\frac{\partial \cos\theta}{\partial\theta}\right|_{\theta_0} (\theta - \theta_0) \Rightarrow \cos\theta = \cos\frac{\pi}{4} - \operatorname{sen}\frac{\pi}{4}(\theta - \pi/4) = \frac{\sqrt{2}}{2} - \frac{\sqrt{2}}{2}(\theta - \pi/4)$$

$$m\dot{v} = F - mru + m\dot{x}\dot{r}$$

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

$$m\dot{v} = f(F, r, u, \dot{r}, x)$$

$$f(F, r, u, \dot{r}, x) = f(\bar{F}, \bar{r}, \bar{u}, \dot{\bar{r}}, \bar{x}) + \left.\frac{\partial f}{\partial F}\right|(F - \bar{F}) + \left.\frac{\partial f}{\partial r}\right|(r - \bar{r}) + \left.\frac{\partial f}{\partial u}\right|(u - \bar{u}) + \left.\frac{\partial f}{\partial \dot{r}}\right|(\dot{r} - \dot{\bar{r}}) + \left.\frac{\partial f}{\partial x}\right|(x - \bar{x})$$

1) $f(\bar{F}, \bar{r}, \bar{u}, \dot{\bar{r}}, \bar{x}) = m\dot{\bar{v}} = \bar{F} - m\dot{\bar{r}}\bar{u} + m\bar{x}\dot{\bar{r}} \Rightarrow \bar{F} = 0$ ($\dot{\bar{r}} = 0$, $\bar{u} = 0$)

2) $\left.\frac{\partial f}{\partial F}\right|_{eq}(F - \bar{F}) = 1 \cdot F$

3) $\left.\frac{\partial f}{\partial r}\right|_{eq}(r - \bar{r}) = -m\dot{\bar{u}}r$

4) $\left.\frac{\partial f}{\partial u}\right|_{eq}(u - \bar{u}) = -m\dot{\bar{r}}(u - \bar{u}) = 0$ ($\dot{\bar{r}} = 0$)

5) $\left.\frac{\partial f}{\partial \dot{r}}\right|_{eq}(\dot{r} - \dot{\bar{r}}) = m\bar{x}\dot{r}$

6) $\left.\frac{\partial f}{\partial x}\right|_{eq}(x - \bar{x}) = m\dot{\bar{x}}(x - \bar{x}) = 0$ ($\dot{\bar{x}} = 0$)

$$f = F - m\dot{\bar{u}}r + m\bar{x}\dot{r}$$