05.11.25

$$\dot x = f(x) + g(x)u - \varphi(x)\mu$$

КАК ОСУЩЕСТВ. КОМПЕНС.?

$\hat\mu$: $\quad g(x)u_\Sigma - \varphi(x)\hat\mu = g(x)u_b$

$$u_\Sigma = u_b + u_c$$

$$\cancel{g(x)u_b} + g(x)u_c - \varphi(x)\hat\mu = \cancel{g(x)u_b}$$

$$g(x)u_c = \varphi(x)\hat\mu$$

ЛИН. СЛУЧАЙ

$$\underbrace{\begin{pmatrix}\dot p\\ \ddot p\end{pmatrix}}_{\dot x} = \underbrace{\begin{pmatrix}0&1\\0&0\end{pmatrix}}_{A}\underbrace{\begin{pmatrix}p\\ \dot p\end{pmatrix}}_{x} + \underbrace{\begin{pmatrix}0\\ \frac{1}{m}\end{pmatrix}}_{B}\underbrace{(F)}_{u}$$

ЗНАЕМ Bu; u – ?

$$\dot x = f(x) + g(u) + \varphi^T(x)\mu \qquad // g$$

$\hat\mu$ – ОЦЕНКА

$$u_\Sigma = u_b + u_c$$

$$g(u_\Sigma) + \varphi^T(x)\hat\mu = g(u_b)$$

$$g(u_b + u_c) = g(u_b) - \varphi^T(x)\hat\mu \qquad \Big|\ g^{-1}(\ldots)$$

$$\underbrace{u_b + u_c}_{u_\Sigma} = g^{-1}\left(g(u_b) - \varphi^T(x)\hat\mu\right)$$

ПОДСТАВИМ В УР. ДИН.

$$\dot x = f(x) + \cancel{g(g^{-1}}(g(u_b) - \varphi^T(x)\hat\mu)) + \varphi^T(x)\mu$$

$$\dot x = f(x) + g(u_b) + \varphi^T(x)(\mu - \hat\mu)$$

$$V(x) = \underbrace{V_0(x)}_{CLF} + \frac{(\mu-\hat\mu)^T(\mu-\hat\mu)}{2\alpha}$$

$$\frac{d}{dt}V(x) = \nabla V_0^T \dot x + \frac{\dot{\hat\mu}(\mu-\hat\mu)}{\alpha} = \nabla V_0^T f(x) + \nabla V_0^T g(u_b) +$$

$$+ \nabla V_0^T \varphi^T(x)(\mu-\hat\mu) + \frac{\dot{\hat\mu}^T(\mu-\hat\mu)}{\alpha} = \underbrace{\nabla V_0^T\left(f(x) + g(u_b)\right)}_{<0} +$$

$$+ \overset{=0???}{(\mu-\hat\mu)}\left[\nabla V_0^T \varphi^T(x) - \frac{\dot{\hat\mu}^T}{\alpha}\right] \le 0$$

$$\nabla V_0^T \varphi^T(x) = \frac{\dot{\hat{\mu}}^T}{\alpha}$$

$$\dot{\hat{\mu}}^T = \alpha \nabla V_0^T \varphi^T(x)$$

$$\dot{\hat{\mu}} = \alpha \varphi(x) \nabla V_0$$