

## 28. Zero dynamics

lunedì 13 luglio 2020 18:40

The dynamics under which the system evolves when the input is forced to be zero is given by:

$$\dot{\eta} = q(0, \eta) \quad \eta_0 \neq 0$$

$$\text{over } z^* = \{x \in \mathbb{R}^n \mid H_1(x) = 0, H_2(x) = 0\}$$

$$h_1 = L_g h_1 = \dots = h_2 = L_g h_2 = 0$$

the feedback which maintains the output to zero is

$$v^* = -A^{-1}(x) b(x) \quad f^* = f + g v^*|_{z^*}$$

In conclusion, when not in the normal form, the zero dynamics can be computed

$$\dot{\eta} = q(0, \eta) - p(0, \eta) A^{-1}(0, \eta) b(0, \eta)$$

$$v^* = -A^{-1}(0, \eta) b(0, \eta) \quad z=0, \eta \text{ only}$$