$x_0 \in \mathbb{R}^n$

$$x(t) = e^{At}x(0) + \int_0^t e^{A(t-\tau)} B u(\tau)\, d\tau$$

Modos : $[0 - t_1]$: $\dot{x} = A_1 x + \overset{cte}{\boxed{B_1 \cdot u_1}}$

$[t_1 - t_2]$: $\dot{x} = A_2 x + B_2 \cdot u_2$

$\vdots$

$[t_{N-1} - t_N]$: $\dot{x} = A_N x + B_N u_N$

$$x(t_1) = \underbrace{\boxed{e^{A_1 t_1}}}_{F_1} x(0) + \underbrace{\left[\int_{\overset{t_1}{0}}^{\overset{0}{t_1}} e^{A_1 \underset{\sigma}{(t_1-\tau)}}\, \underset{-d\sigma}{d\tau}\right] B_1 u_1}_{\underbrace{\int_0^{t_1} e^{A_1 \tau} B_1\, d\tau}_{G_1} \cdot\, u_1}$$

$[F_1, G_1] = c2dm(A_1, B_1, [\,], [\,], t_1, 'ZOH')$

$$\begin{cases} x(t_1) = F_1\, x(0) + G_1 u_1 \to cte \\ x(t_2) = F_2\, x(t_1) + G_2 u_2 \to cte \\ \vdots \\ x(t_N) = F_N\, x(t_{N-1}) + G_N u_N \end{cases}$$

$[F_2, G_2] = c2dm(A_2, B_2, \overset{C}{[\,]}, \overset{D}{[\,]}, t_2 - t_1, 'ZOH')$

$$x(t_N) = F_N \cdot F_{N-1} \cdots F_1\, x(0) + \overset{c(t_1, t_2, \ldots, t_N)}{\boxed{F_N F_{N-1} \cdots F_2 G_1 u_1 + F_N F_{N-1} \cdots F_3 G_2 u_2 + \cdots + F_N G_{N-1} u_{N-1} + G_N u_N}}$$

Queremos $x(t_N) = x(0) = ?$

$$\underbrace{(I - F_N F_{N-1} \cdots F_1)}_{\text{suposta invertível}}\, x(0) = c \iff \underline{\underline{x(0) = (I - F_N F_{N-1} \cdots F_1)^{-1} c}}$$