SISTEMI LTI

Per lavorare con i sistemi LTI si usano i numeri complessi o derivate.

$$\frac{dx}{dt} = Ax + Bu$$

$$y = Cx + Du$$

$$u \longrightarrow \boxed{\begin{array}{l} \text{E} \\ \quad\quad \text{X} \end{array}} \quad \longrightarrow y$$

u = ingressi;
y = uscite;
x = stato

Variazione di un sistema LTI
   -derivate: *-sistema:*   *-"x" e "u"variabili*
                                                                            -"A,B,C,D" parametri
                                                                            -"X" e "y" uscite

$$x = \frac{dx}{dt} = \frac{x_2 - x_1}{t_2 - t_1} \qquad \begin{aligned} X &= (A)(x) + (B)(u) \\ y &= (C)(x) + (D)(u) \end{aligned}$$

$$X = (A)(x) + (B)(u)$$
$$y = (C)(x) + (D)(u)$$

$$y = (x_1)$$
$$X_1 = (2x_2)$$
$$X_2 = (u_1)$$

$$\left(\frac{X_1}{X_2}\right) = \left(\frac{0..2}{0..0}\right)\left(\frac{x_1}{x_2}\right) + \left(\frac{0}{1}\right)(u_1)$$

$$y = \left(\frac{1}{0}\right)\left(\frac{x_1}{x_2}\right) + (0)(u)$$

esempio partendo dall'equazione:

$$X_1 = 3x_1 + 2x_2 + 5u_1$$
$$X_2 = 7x_2 + 3u_2$$
$$y_1 = x_2$$
$$y_2 = 0$$

$$X = (A)(x) + (B)(u)$$
$$y = (C)(x) + (D)(u)$$

$$\left(\frac{X_1}{X_2}\right) = \left(\frac{3..2}{0..7}\right)\left(\frac{x_1}{x_2}\right) + \left(\frac{5..0}{0..3}\right)\left(\frac{u_1}{u_2}\right)$$

$$\left(\frac{y_1}{y_2}\right) = \left(\frac{0..1}{0..0}\right)\left(\frac{x_1}{x_2}\right) + \left(\frac{0..0}{0..0}\right)\left(\frac{u_1}{u_2}\right)$$