

FCA

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1 Ex Lez 20 Slide 16

1.1 Parte 1

$$y_0(K+2) = y(K+1) - 0.24y(K) + u(K+2)$$

$$a_n y(K) + a_{N-1} y(K-1) + \dots + a_0 y(K-n) = b_n u(K-n+m) + b_{n-1} u(K-n+m-1) + \dots + b_0 u(K-n)$$

$$\Leftrightarrow H(z) = \frac{b_m z^n + b_{m-1} z^{m-1} + \dots + b_0}{a_m z^n + a_{n-1} z^{n-1} + a_0}$$

$$\begin{cases} a_n \neq 0 \\ b_m \neq 0 \\ m \leq na_0 \vee b_0 \neq 0 \end{cases}$$

$$K \leftarrow K-1$$

$$y(K) = y(K-1) - 0.24y(K-2) + u(K)$$

$$y(K) - y(K-1) + 0.24y(K-2) = u(K)$$

$$1. K-2 = K-n \Rightarrow n=2$$

$$2. K = K-n+m \Rightarrow 0 = -n+m \quad m=n=2$$

$$\text{Grado di relativit } g = m-n=0$$

$$Y(z) = -Z^{-1}Y(z) + 0.24Z^{-2}Y(z) = U(z)$$

$$Y(z) \cdot (1 - Z^{-1} + 0.24Z^{-2}) = U(z)$$

$$Y(z) = \frac{1}{1 - Z^{-1} + 0.24Z^{-2}} U(z) = \frac{Z^{-2}}{Z^2 - z + 0.24} U(z)$$

$$n=2, m=2 \Rightarrow \rho = n-m=0$$

1.2 Parte 3

$$Z[a^{k-1}1(K-1)] = \frac{1}{z-a}$$

$$Z[(K-1)a^{k-2}1(K-1)] = \frac{1}{(z-a)^2}$$

$$H(z) = Z(h(K)) = \frac{1}{z-1} - \frac{5}{2} \frac{1}{(z-\frac{1}{2})} - 7 \frac{1}{z-\frac{1}{z-\frac{1}{2}}} =$$

$$\dots = \frac{z^2+1}{z^3-2z^2+\frac{5}{4}z-\frac{1}{4}}$$

$$y(K) - 2y(K-1) + \frac{5}{4}y(K-2) - \frac{1}{4}y(K-3) = u(K-1) + u(K-3)$$