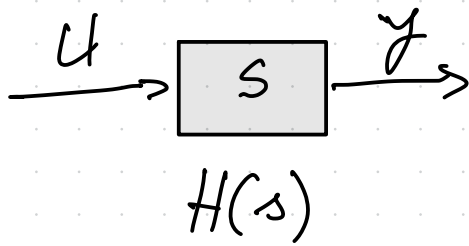


# Modelarea matematică a sistemelor fizice



$$H(s) = \frac{y(s)}{u(s)}$$

time  
continuous

$$H(z) = \frac{y(z)}{u(z)}$$

time  
discrete

condiții inițiale NULE

$$a_n y^{(n)}(t) + a_{n-1} y^{(n-1)}(t) + \dots + a_1 y'(t) + a_0 y(t) = b_m u^{(m)}(t) + \dots + b_0 u(t) \quad / \mathcal{L}$$

$$a_n y(k+n) + a_{n-1} y(k+n-1) + \dots + a_0 y(k) \quad / \mathcal{Z}$$

Intrare - Ieșire

MM II

$n \geq m$

Intrare - Stare - Ieșire

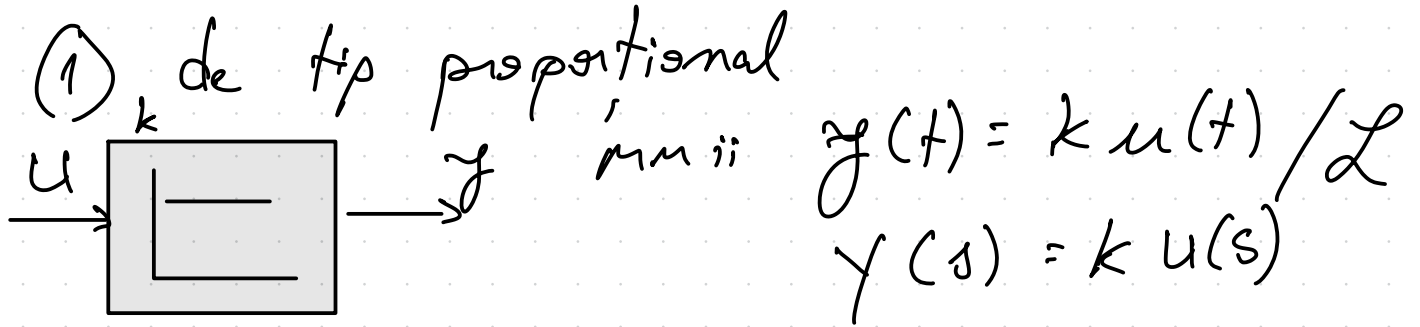
MM-isi

$$\begin{cases} \dot{x}(t) = Ax(t) + Bu(t) \\ y(t) = Cx(t) + Du(t) \end{cases} \quad / \mathcal{L}$$

$D=0$   
fizic realizabil

$$\begin{cases} sX(s) = AX(s) + Bx(s) \\ Y(s) = CX(s) \end{cases}$$

# Elemente de transfer

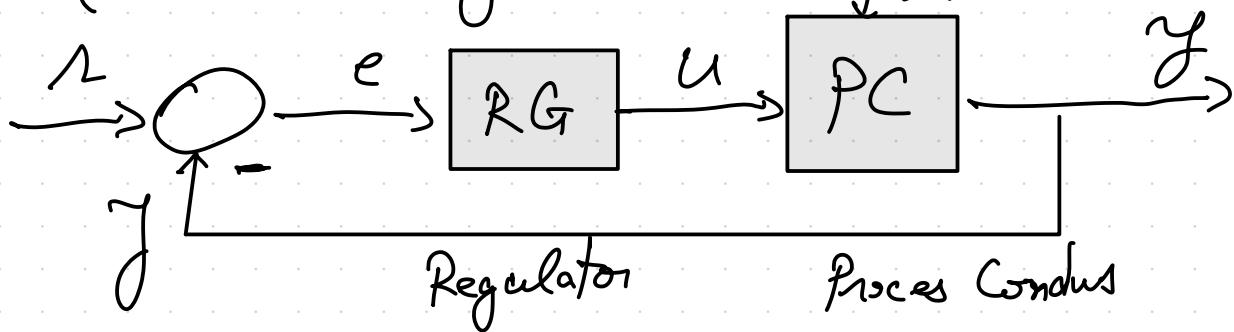


(2) Integrator

(3) Derivator

(4) Proportional cu temporizare de ordin 1  
ET-PT<sub>1</sub> → filtru trece-jos

(5) Proportional integrator (ET-Pi)  
(sistem de reglare automat)



## Tipuri de conexiuni

(1) serie  
 $H_1(s) \cdot H_2(s)$

(2) paralel  
 $H_1(s) + H_2(s)$

(3) reacție  
$$\frac{H_1(s)}{1 \pm H_1(s)H_2(s)}$$

Termo:  $H(s) = C (sI - A)^{-1} \cdot B$   
+ pag 6 matrici