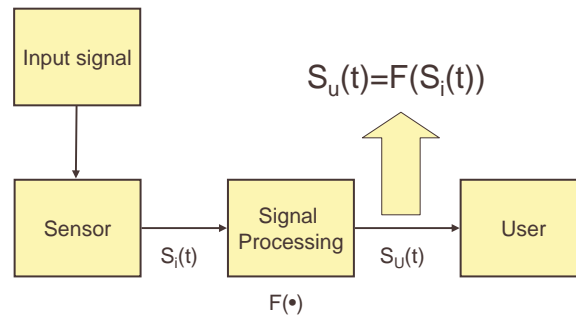







Electrical signals



$$S_i(t), S_u(t) \begin{cases} V(t) = \frac{\int E \cdot ds}{Q} & [V] = [J][C]^{-1} \\ i(t) = \frac{Q}{t} & [i] = [C][\text{sec}]^{-1} \end{cases}$$

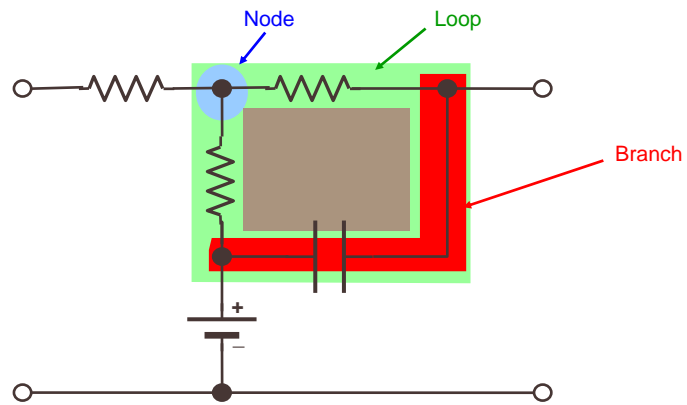
1

Basic Ideal Bipoles

- ❖ Resistance: $v(t) = Ri(t)$  (R in Ohm $\Omega = V/A$)
- ❖ Inductance: $v(t) = L \frac{di(t)}{dt}$  (L in Henry = Vs/A)
- ❖ Capacitance: $i(t) = C \frac{dv(t)}{dt}$  (C in Farad = Coulomb/V)
- ❖ Generators (i, v)  $V \text{ constant } \forall i$
-  $i \text{ constant } \forall V$

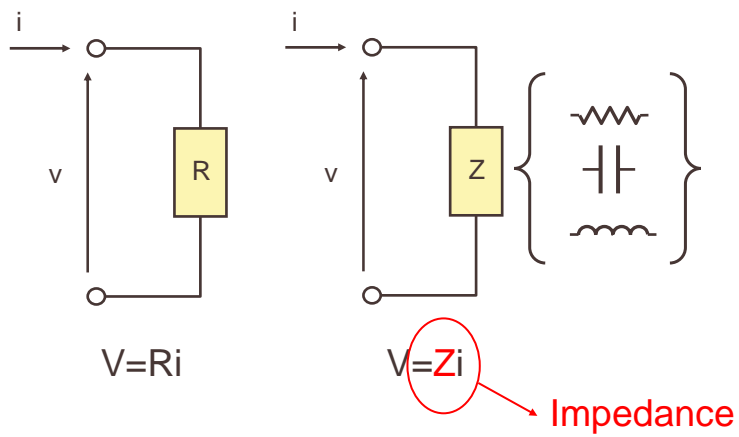
2

Topology of electrical circuits



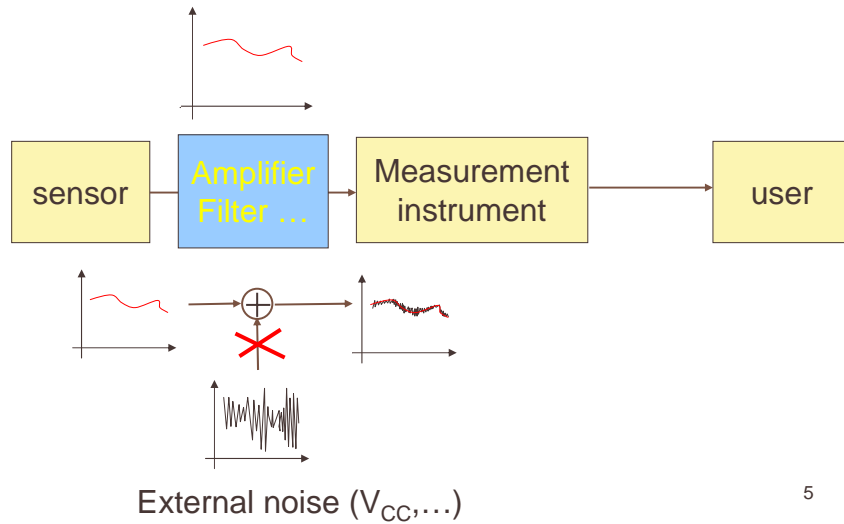
3

Ohm's Law



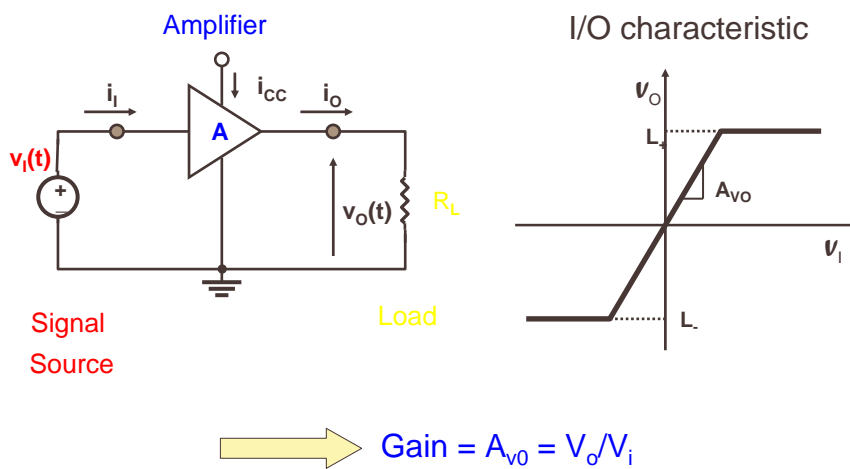
4

Example of sensor output



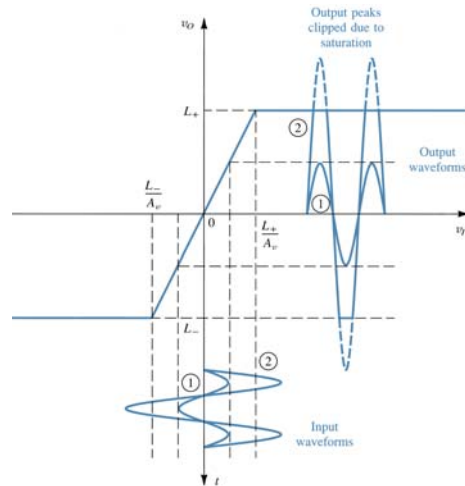
5

Amplifier



6

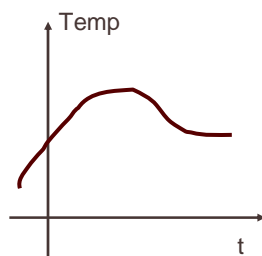
Amplifier: behavior idea



7

Digital processing

It's an analog world

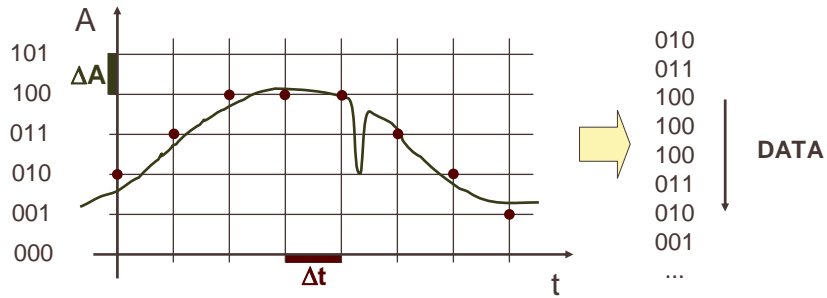


It's a digital world

Time	Temperature
0	36.5
1	37.0
2	37.5
3	38.0
4	38.0
5	38.5
6	39.5
7	35.5

8

AD: Analog to Digital

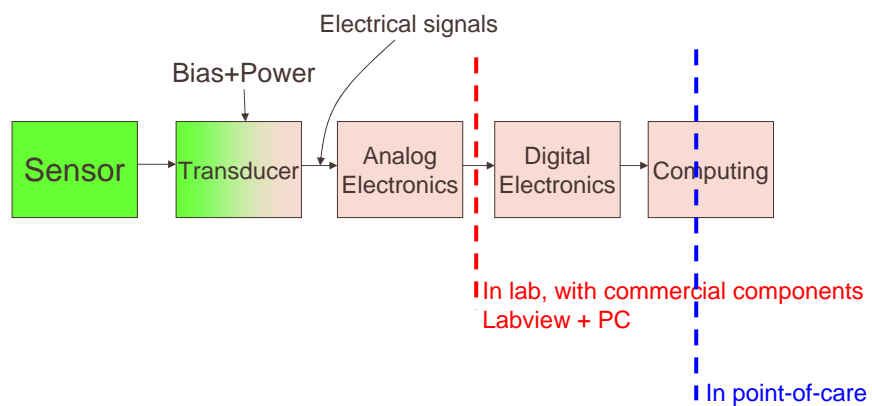


2 parameters: Δt , ΔA

→ Structure, technology and cost

9

All together



10