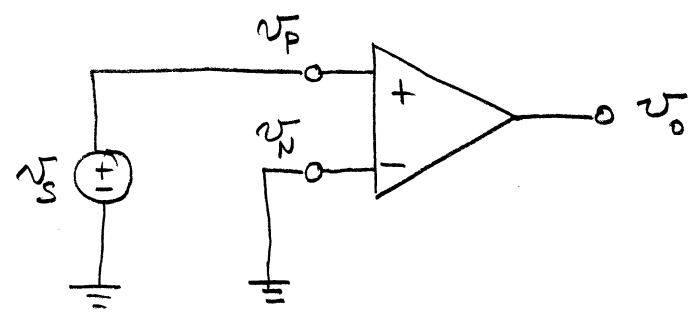


4-7 The Comparator.



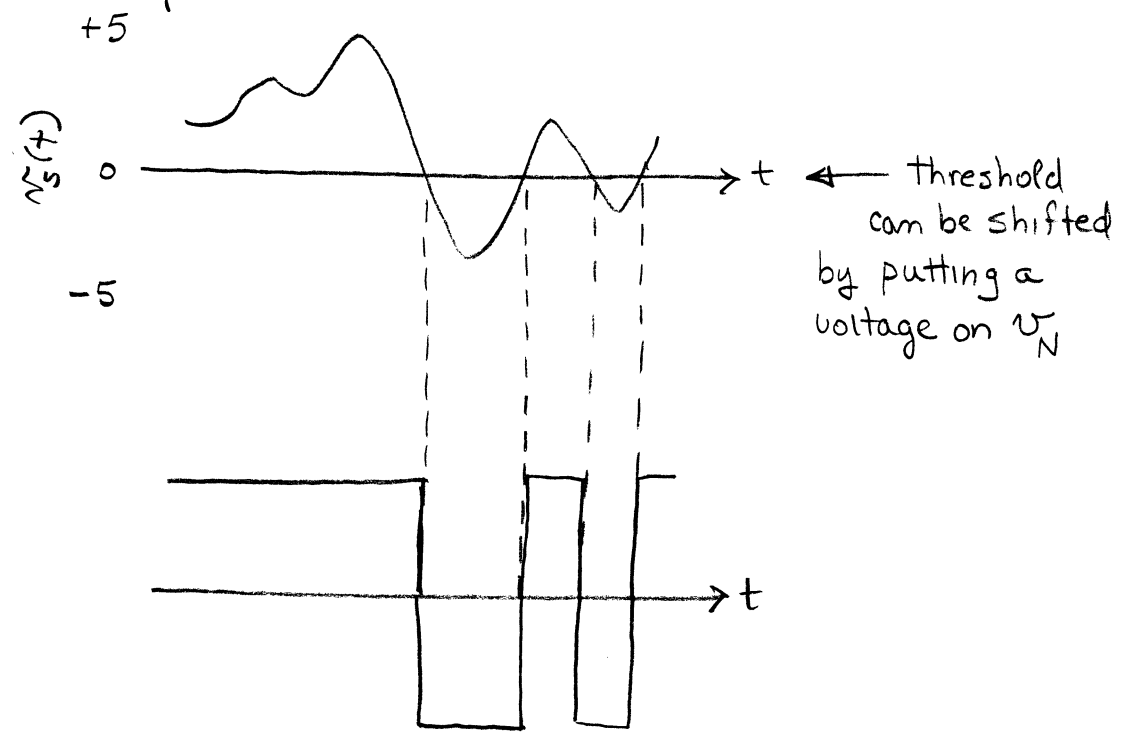
A device that discriminates between two unequal voltages is called a comparator.

The circuit shown above is called a zero crossing detector.

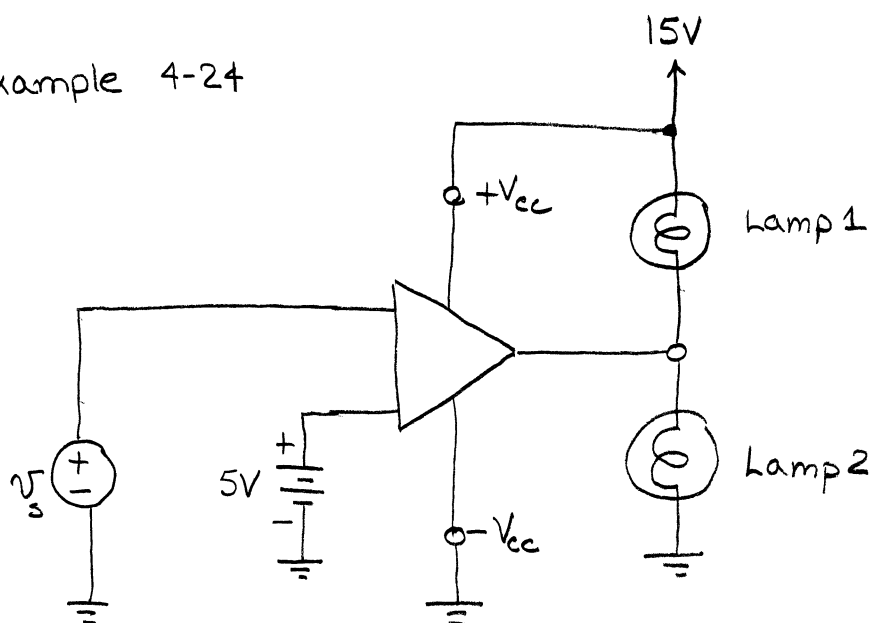
If $v_p > v_n$ then $v_o = +\text{saturation}$

$v_p < v_n$ then $v_o = -\text{saturation}$

Input/output signals.



Example 4-24



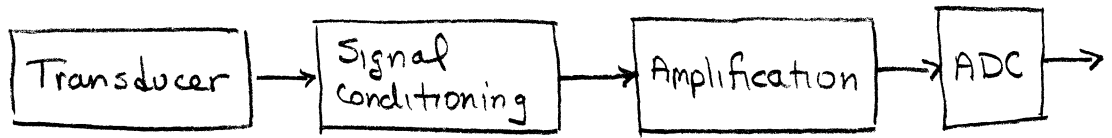
No feedback so this is a comparator.

The threshold (switching point) is at $v = +5$ volts.

When $v_s < +5$ volts $v_o = 0 \Rightarrow$ Lamp 1 ON
Lamp 2 OFF

$v_s > +5$ volts $v_o = +15 \Rightarrow$ Lamp 1 OFF
Lamp 2 ON

Instrumentation Systems

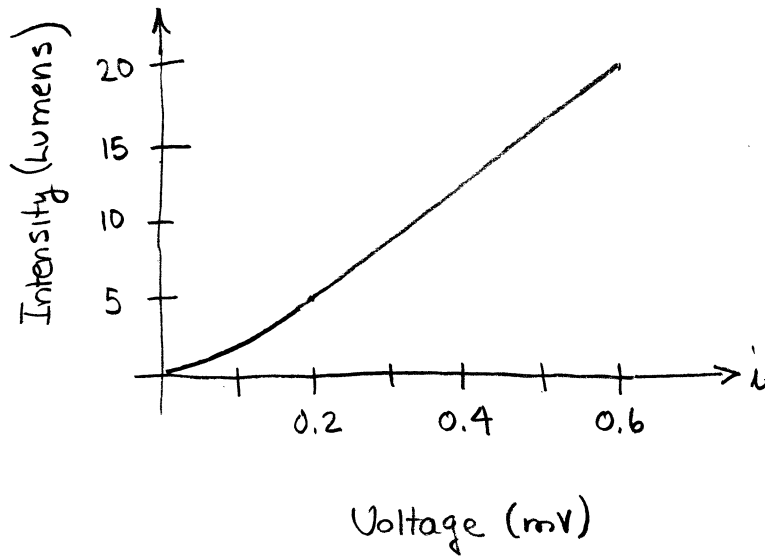


can be filtering, linearization, etc.

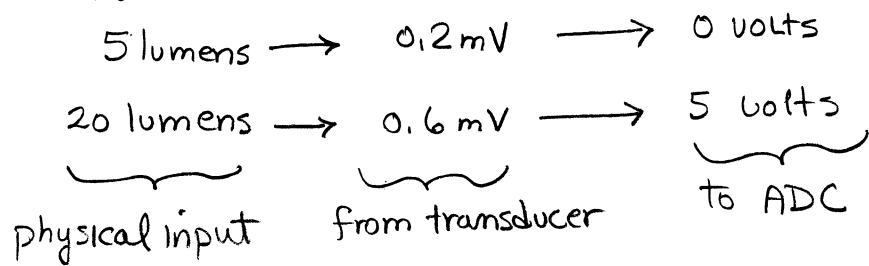
converts analog to digital

need amplification to get signal up to useful level.

Example



Characteristics of photocell transducer
 need to measure 5-20 lumens input to a 0-5V ADC
 We need to convert



This requires an amplifier with a DC offset

The amplifier gain necessary is

$$K = \frac{\text{desired output}}{\text{transducer output range}} = \frac{5-0}{(0.6-0.2) \times 10^{-3}} = 1250$$

This is a lot of gain so we implement it as two amplifiers

