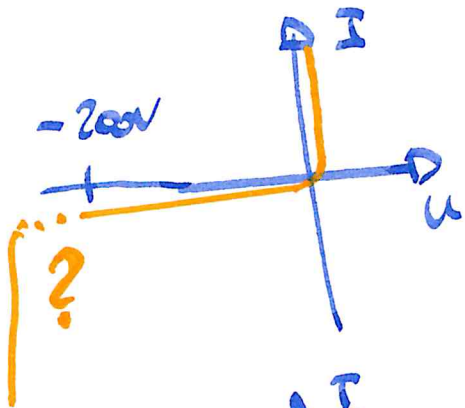
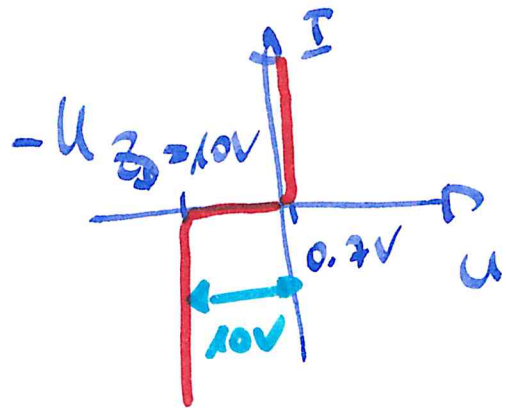


17.06.19 Industrial Electr. ①  
Devices

• Z-Diodes = Zener Diodes



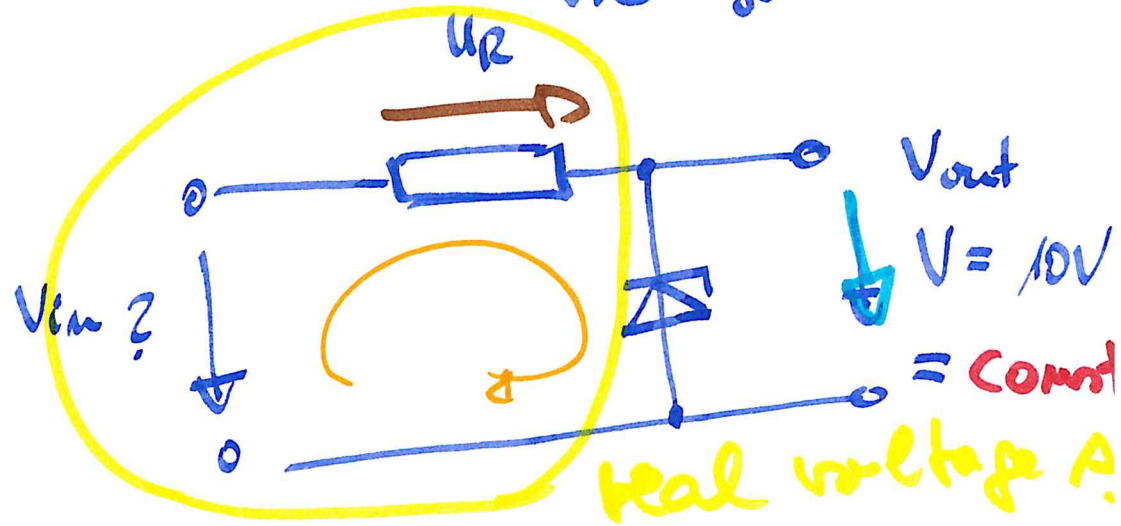
general diode



Zener diode

$U_{ZD} = 1V \dots 5V \dots 10V \dots 30V$   
 defined break down point  $U_{ZD}$

② Application: To limit the voltage



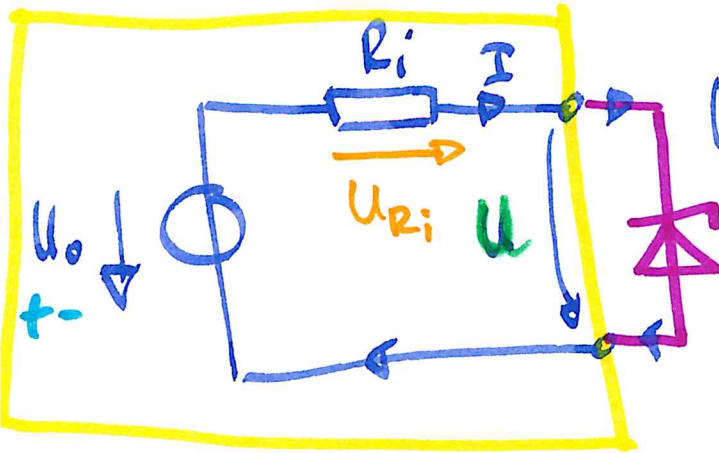
Example 1  $V_{in} = 30V$ ;  $V_{out} = 10V$

$$U_R + V_{out} - V_{in} = 0$$

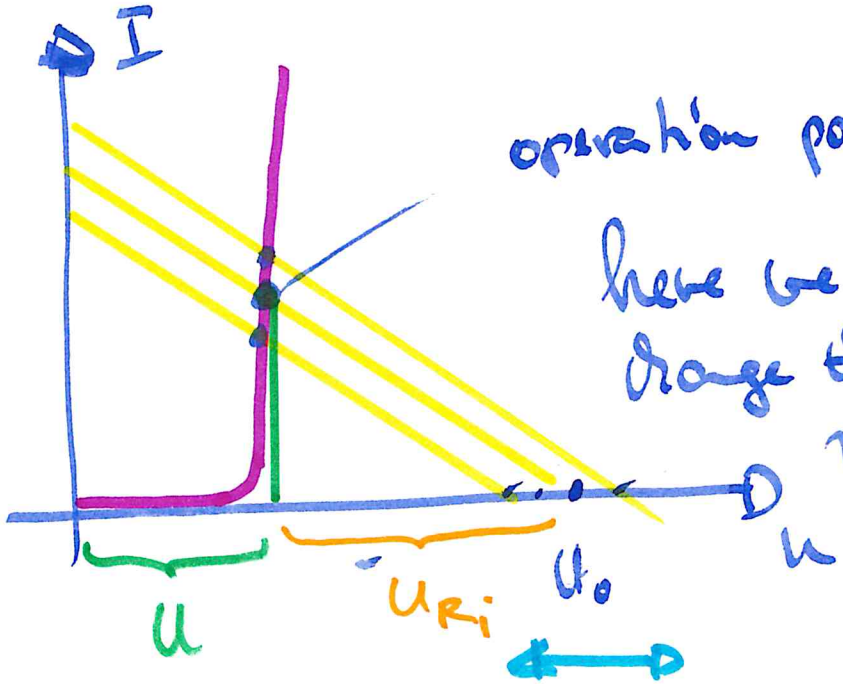
(Kirchhoff 2)

$$U_R = V_{in} - V_{out} = 30V - 10V = \underline{\underline{20V}}$$

another view:



$$U = U_0 - I \cdot R_i$$

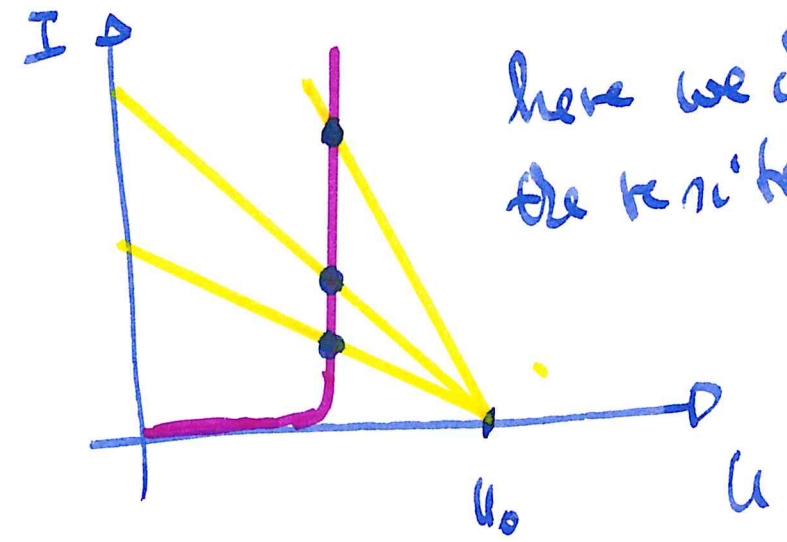


operation point  
here we change the voltage

(3)

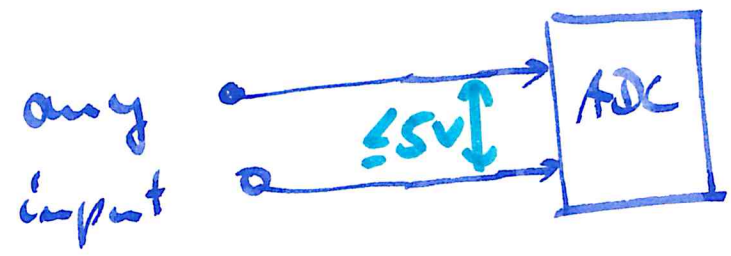
(4)

create a spec. operation p.:

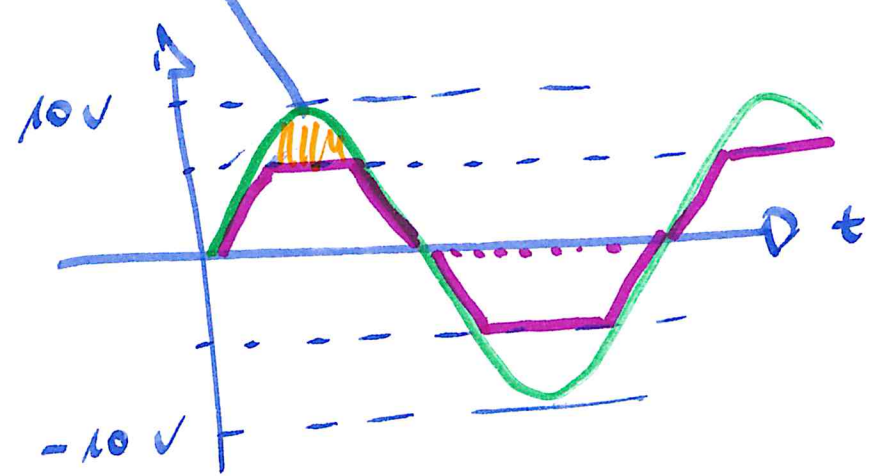
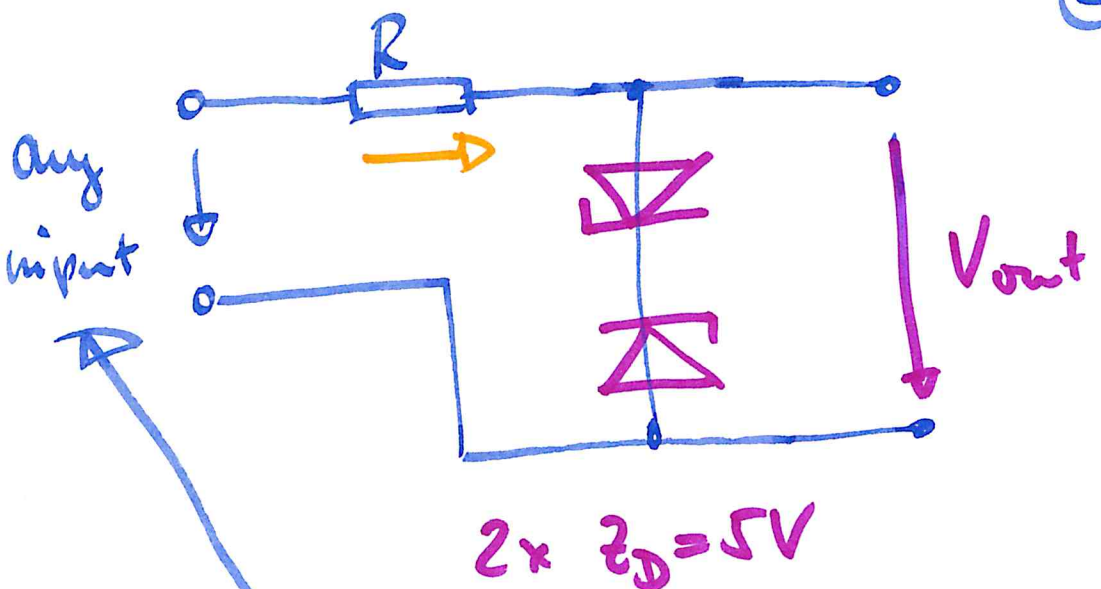


here we change the resistor

Example 2: limit the voltage in AC circuits.  
For ex: ADC

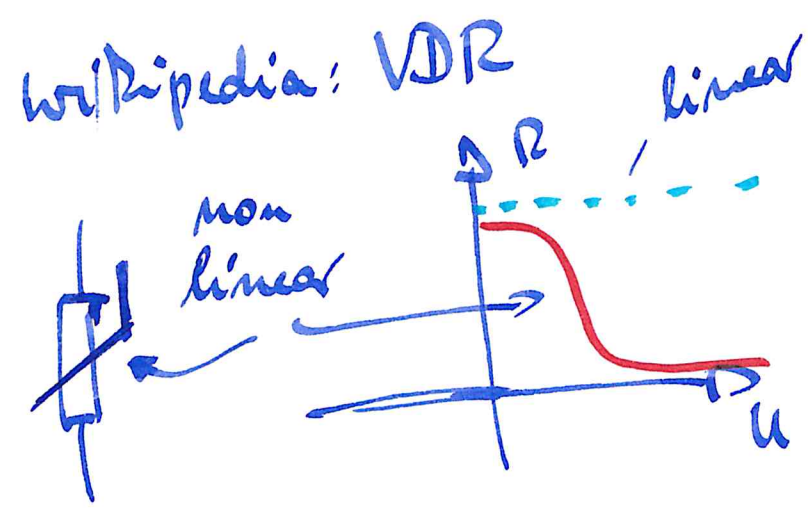
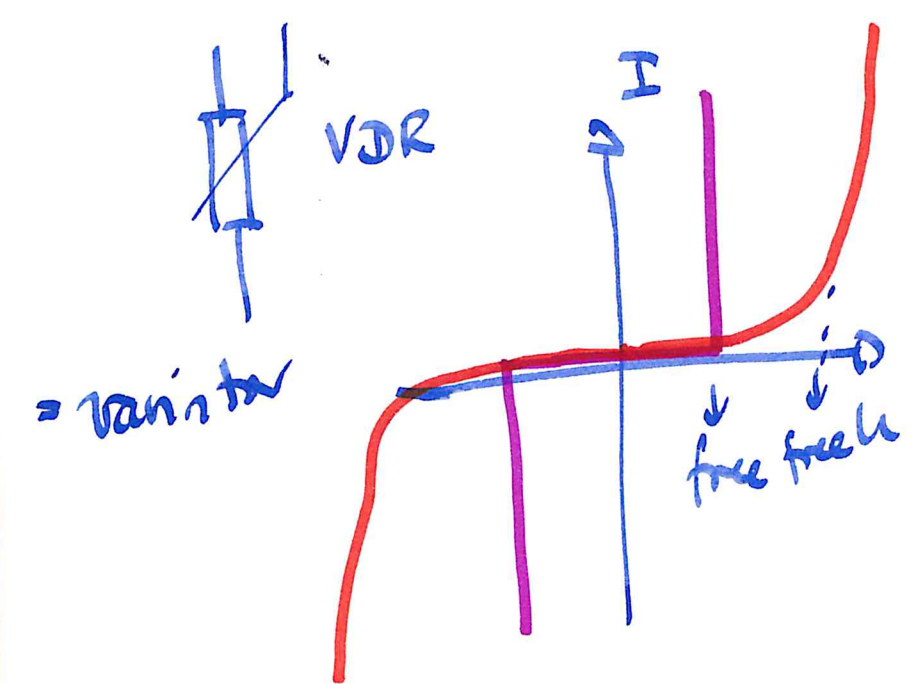


9D

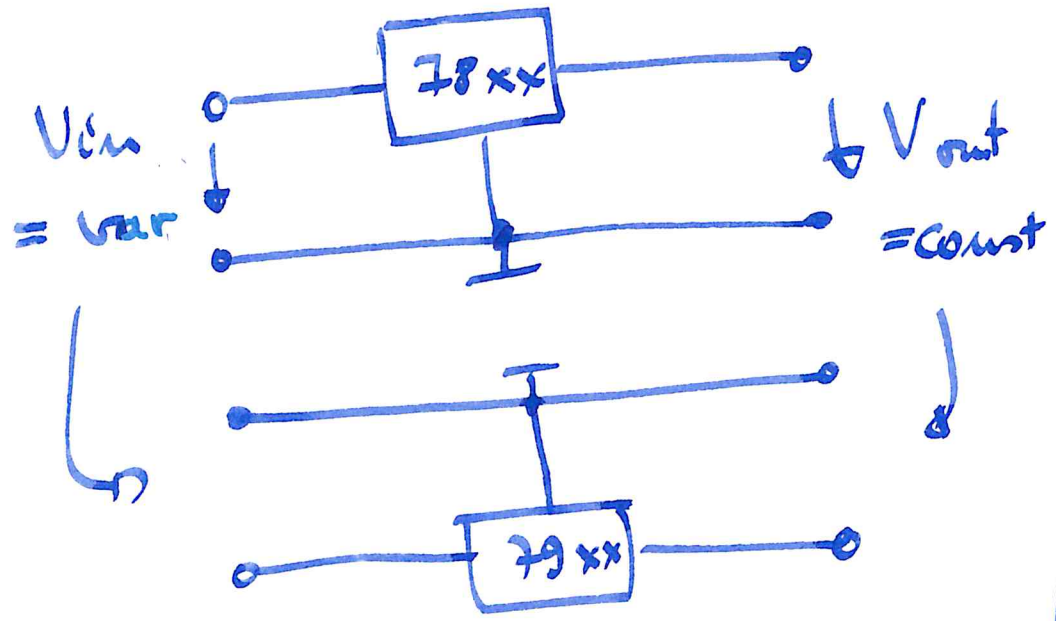


VDR limits the voltage in both directions

⑤ ⑥ Alternative product VDR  
 voltage / current dependent



- Voltage regulator 78xx (7)
- > to build a good constant voltage



if it is necessary to get  $\pm 15V$ , then you need 7815 and 7915

(8)

- xx  $\rightarrow$  stands for the voltage
- 7805  $\rightarrow$  regulator for 5V

- Photo diode (Photo d.)

