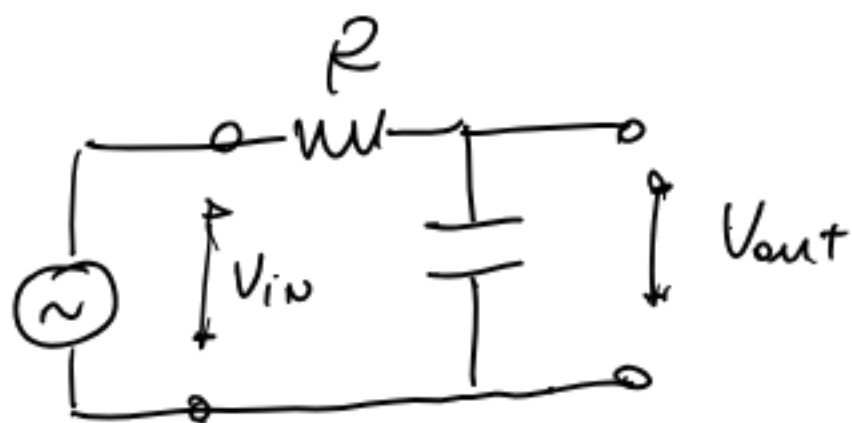


FILTRO RC

PASSA BASSO



$$|T| = \left| \frac{V_{out}}{V_{in}} \right| = \frac{1}{\sqrt{1 + (\omega RC)^2}}$$

ωRC

$f_{cut} \Rightarrow$

$T = \frac{1}{\sqrt{2}}$

$f_{cut} = 1 \text{ kHz}$

$\omega RC = 1$

$\omega = 2\pi f$

$2\pi f RC = 1$

$f_{cut} = \frac{1}{2\pi RC}$

$RC = \frac{1}{2\pi \cdot 10^3}$

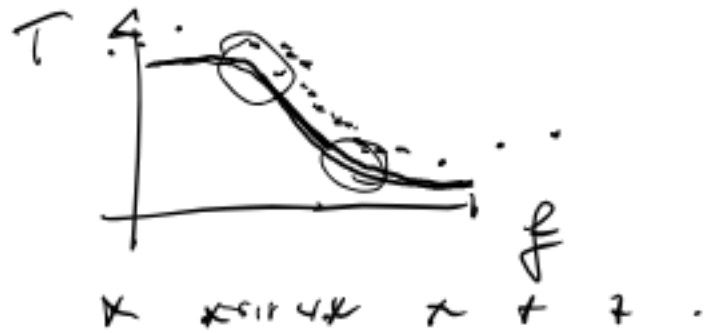
$= \frac{1}{6} \cdot 10^{-3} \approx 0.2 \cdot 10^{-3}$

$RC = \frac{1}{2\pi f_{cut}}$

$RC = 2 \cdot 10^{-4} = \tau$

ES 1

MISURARE 10/20 punti



$$\boxed{T(f)}$$

$\left. \begin{matrix} RC \\ CR \\ RC \\ LR \end{matrix} \right\} = 0$ PASSA BANDA

ES 2

$\boxed{RC} \Rightarrow$ VARIACIONE

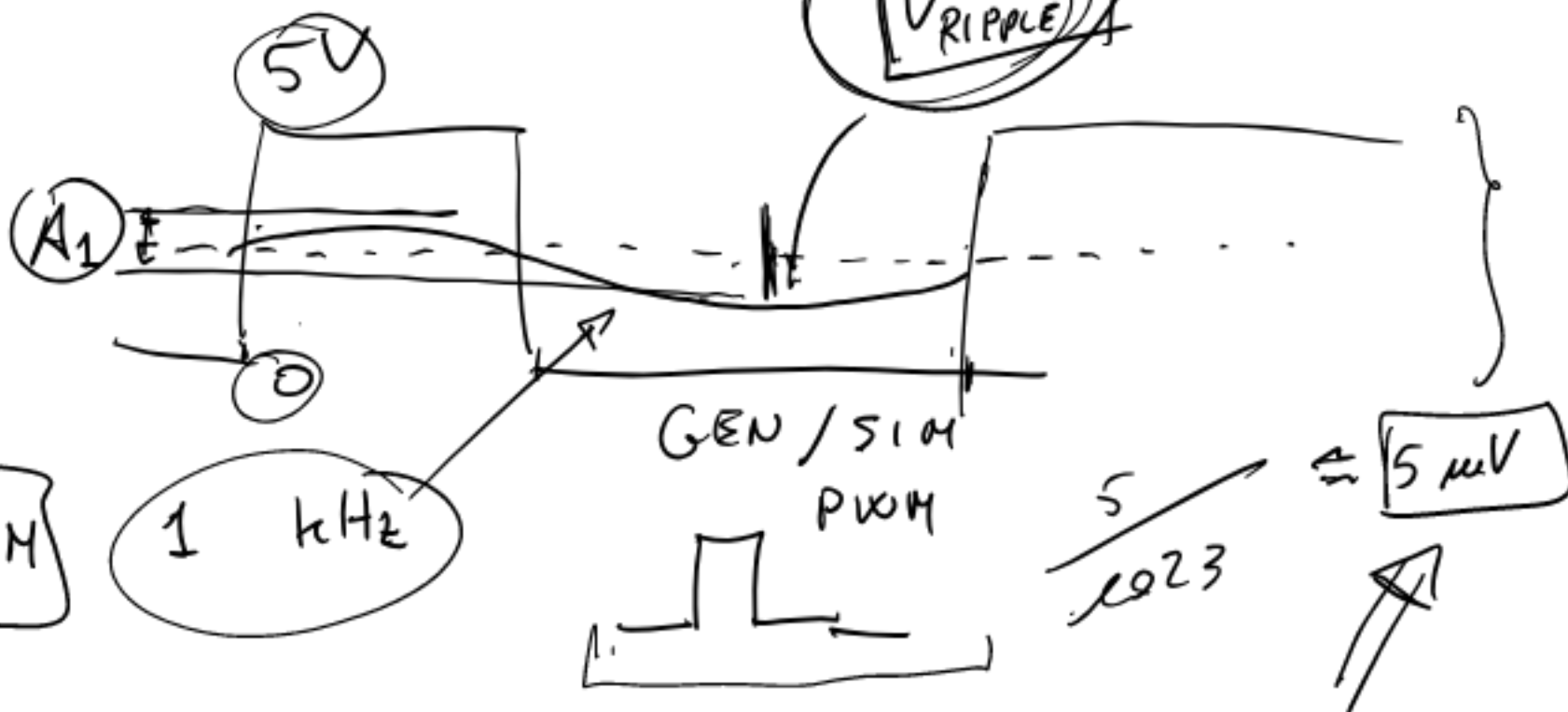
$\boxed{PWM} \Rightarrow$ VARIACIONE



$$\frac{T_H}{T} = DC$$



$\boxed{V_{RIPPLE}}$



$$\frac{5}{2^{23}} \approx \boxed{5 \mu V}$$

Analogico
 Arduino
 ADC 10 bit

$$\frac{5V}{2^{10} - 1} = \frac{5V}{1023} \approx 5 \mu V$$

\boxed{f} PWM

1 kHz

GEN/SIM PWM

$$\boxed{f_{\text{cut}} = 1 \text{ kHz}}$$

$$\Rightarrow RC \approx 2 \cdot 10^{-4}$$

②

$$Z = R - jX_C \Rightarrow$$

$$|I| < I_{\text{max}}$$

$$\underline{V_{\text{in}} = 10 \text{ V}}$$

$$\underline{R = 1 \text{ k}\Omega}$$

$$C = 2 \cdot 10^{-7} \text{ F} = 0.2 \mu\text{F} \\ = 200 \text{ nF}$$

$$\textcircled{1 \text{ kHz}}$$



$V_{PWN} = 5\text{ V}$
 $V_{RIPPLES} \approx 5\text{ mV}$
 $f_{PWN} = 1\text{ kHz}$

RC

PWM con MULTSIM ?

PWM

10% ÷ 90%

$DC_{MIN} > 0\%$
 $DC_{MAX} < 100\%$

