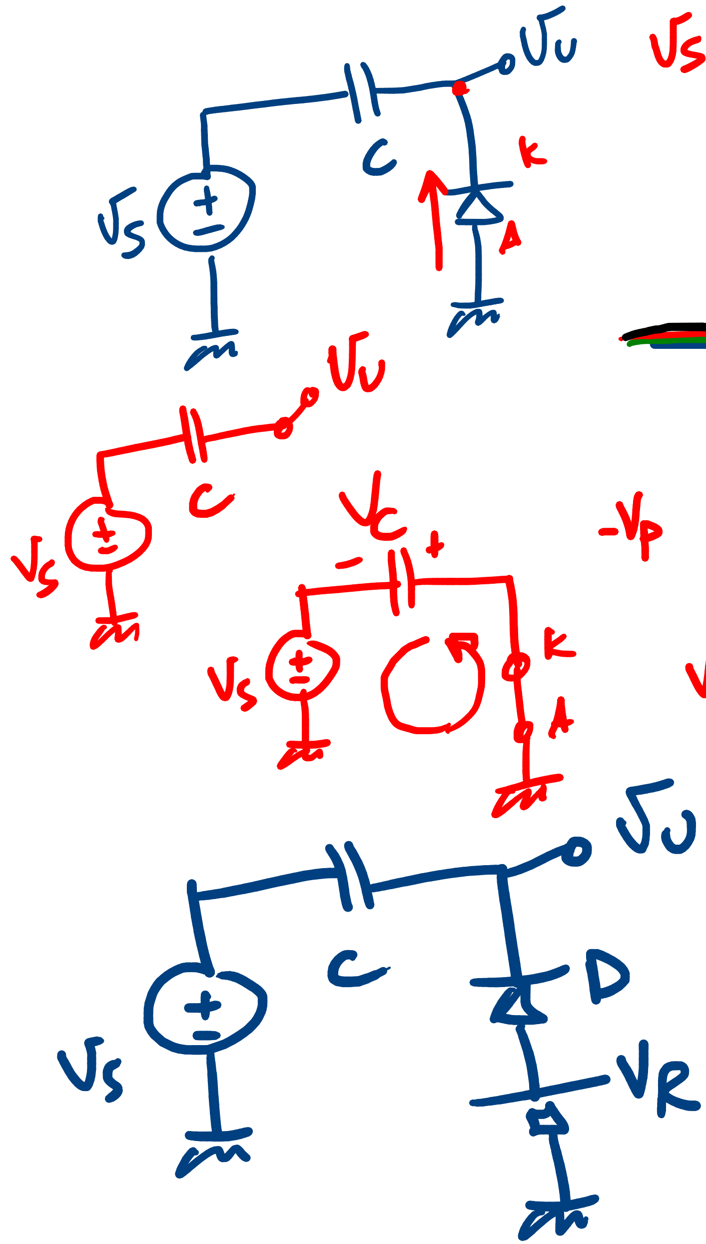
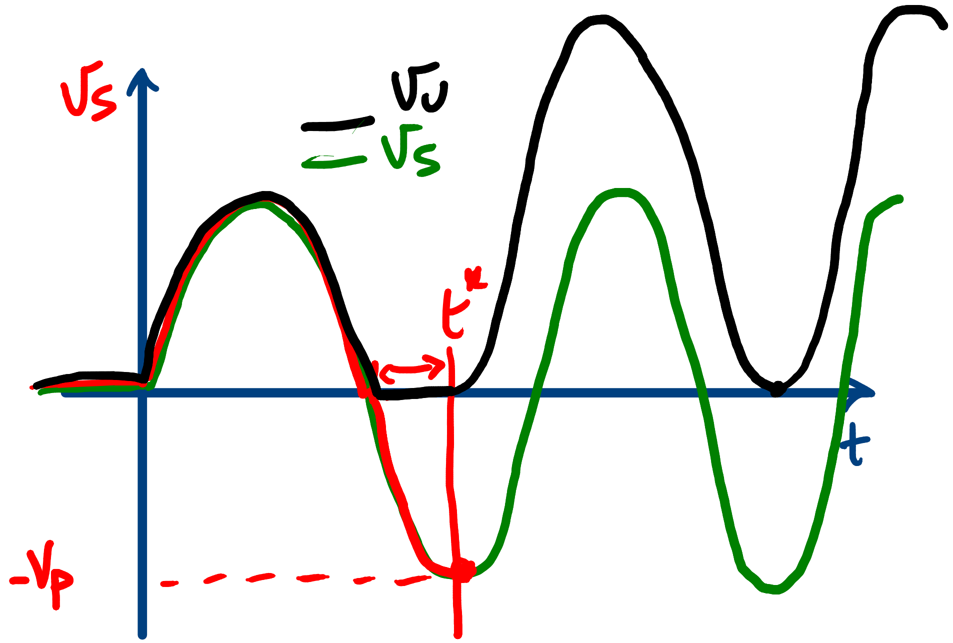
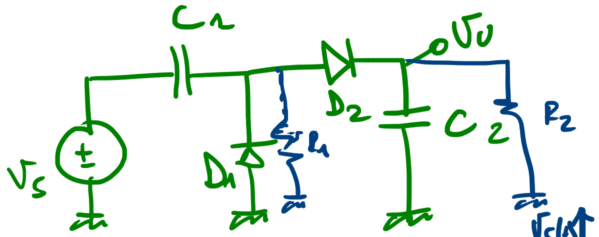
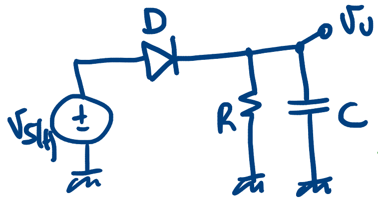
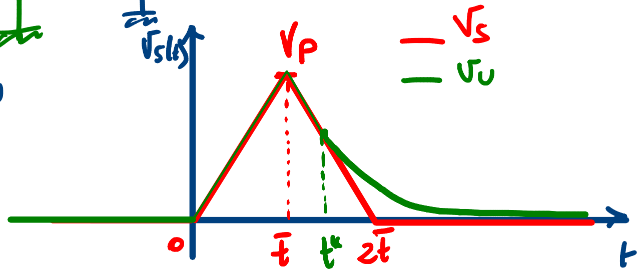




$V_c = -V_s$ $\quad$ $V_c(t^*) = V_p$

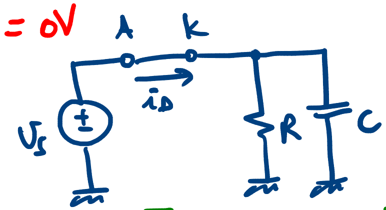






$v_C(t<0) = 0V$

Se D è ON:



$i_D = i_R + i_C$

$$i_D = \frac{v_S(t)}{R} + C\frac{dv_S(t)}{dt} > 0$$

$$v_S: \begin{cases} \sigma t & 0 \le t \le \bar t \\ -\sigma(t-\bar t)+V_P & \bar t < t \le 2\bar t \end{cases} \qquad \sigma = \frac{V_P}{\bar t} \; [V/s]$$

$$i_D = \frac{-\sigma(t-\bar t)+V_P}{R} - C\sigma \qquad i_D(t=t^*)=0$$

$$-\sigma(t^*-\bar t)+V_P = RC\sigma \qquad -\sigma t^* + \sigma\bar t + V_P = RC\sigma$$

$$\boxed{t^* = \frac{\sigma\bar t + V_P - RC\sigma}{\sigma}}$$

per $t \geq t^*$ $\quad v_U(t) = V_U(t^*)\, e^{-\frac{t-t^*}{RC}}$

$$v_U(t) = V_U + v_r(t) = V_U + r(t)$$

$$RF = \frac{\mathrm{rms}\{v_U(t)\}}{V_U} = \frac{\mathrm{rms}\{r(t)\}}{V_U}$$

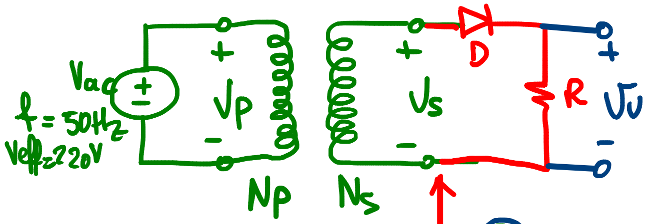
$$\eta_R = \frac{\text{Potenza di uscita dovuta alla continua}}{\text{Potenza totale}}$$

$$V_U = \frac{1}{T}\int_0^T v_U(t)\,dt \qquad V_{eff} = \sqrt{\frac{1}{T}\int_0^T v_U^2(t)\,dt}$$

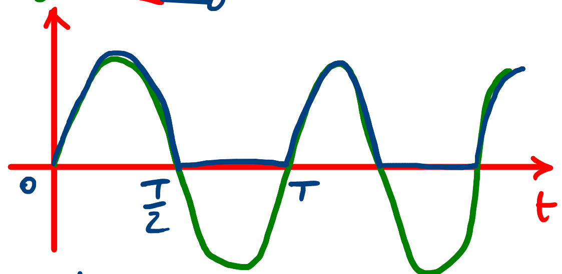
$$V_{Ueff}^2 = \frac{1}{T}\int_0^T [V_U + r(t)]^2\,dt = \frac{1}{T}\int_0^T [V_U^2 + 2V_U r(t) + r^2(t)]\,dt =$$

$$= V_U^2 + \underbrace{\frac{1}{T}\int_0^T r^2(t)\,dt}_{R_{eff}^2} = V_U^2 + R_{eff}^2$$

$$RF = \frac{R_{eff}}{V_U} = \frac{\sqrt{V_{Ueff}^2 - V_U^2}}{V_U} \qquad \eta_R = \frac{V_U^2}{V_{Ueff}^2}$$



$$\frac{V_p}{V_s} = \frac{N_p}{N_s}$$



$$V_s = V_m \sin(\omega t)$$

$$V_U = \frac{V_m}{T}\int_0^{\frac{T}{2}} \sin(\omega t)\,dt = \frac{V_m}{\pi} \simeq 0,318\,V_m$$

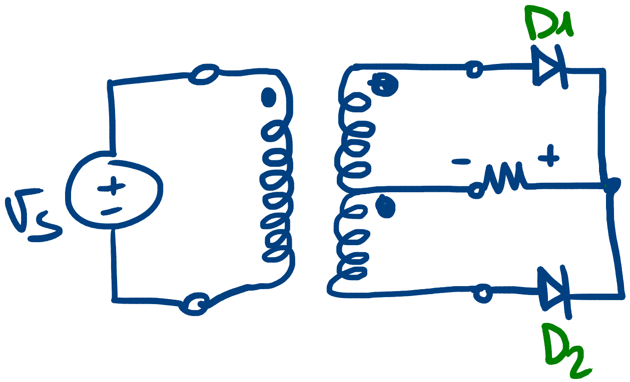
$$\omega = \frac{2\pi}{T}$$

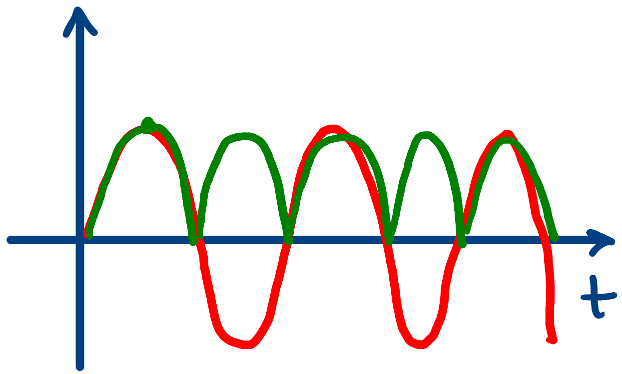
$$V_{Ueff} = V_m \sqrt{\frac{1}{T}\int_0^{\frac{T}{2}} \sin^2(\omega t)\,dt} = V_m \sqrt{\frac{1}{2T}\int_0^{\frac{T}{2}} [1-\cos(2\omega t)]\,dt} =$$

$$= \frac{V_m}{2} = 0,5\,V_m$$

$$RF = \frac{\sqrt{V_{Ueff}^2 - V_U^2}}{V_U} = \sqrt{\frac{\pi^2}{4} - 1} \simeq 1,211$$

$$\eta_R = \frac{V_U^2}{V_{Ueff}^2} = \frac{4}{\pi^2} = 0,4053$$





$$v_U = \left| V_m \sin(\omega t) \right|$$

$$V_U = \frac{2V_m}{T} \int_0^{\frac{T}{2}} \sin(\omega t)\,dt = \frac{2V_m}{\pi} = 0{,}6366\,V_m$$

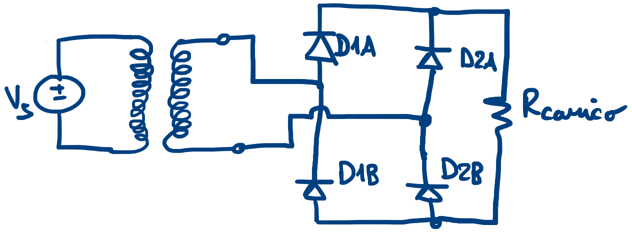
$$V_{Ueff} = V_m \sqrt{\frac{2}{T} \int_0^{\frac{T}{2}} \sin^2(\omega t)\,dt} = V_m \sqrt{\frac{1}{T} \int_0^{\frac{T}{2}} 1-\cos[2\omega t]\,dt} =$$

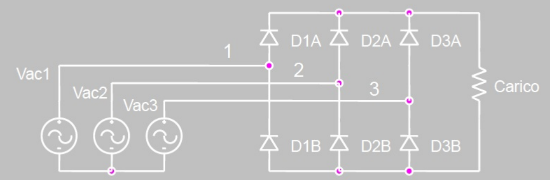
$$= \frac{V_m}{\sqrt{2}} = 0{,}7101\,V_m$$

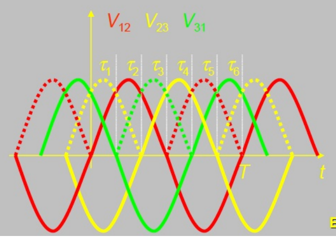
$$RF = \frac{\sqrt{V_{Ueff}^2 - V_U^2}}{V_U} = \sqrt{\frac{\pi^2}{8} - 1} = 0{,}4834$$

$$\eta_R = \frac{V_U^2}{V_{Ueff}^2} = \frac{8}{\pi^2} = 0{,}8106$$

PONTE DI GRAETZ







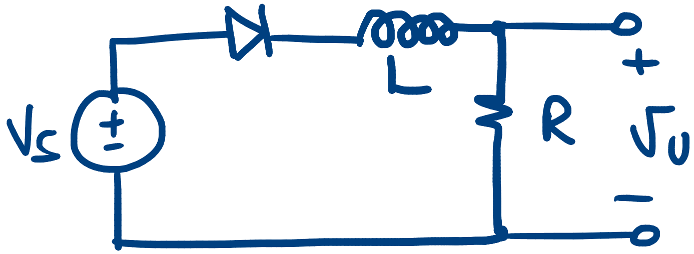
τ_1	D3A, D2B
τ_2	D1A, D2B
τ_3	D1A, D3B
τ_4	D2A, D3B
τ_5	D2A, D1B
τ_6	D3A, D1B

$$V_u = \frac{6V_M}{T}\int_{\frac{2T}{12}}^{\frac{4T}{12}} \sin(\omega t)\,dt = \frac{3V_M}{\pi}\left(\cos\left(\frac{\pi}{3}\right) - \cos\left(\frac{2\pi}{3}\right)\right) = \frac{3V_M}{\pi} = 0.9549 \cdot V_M$$

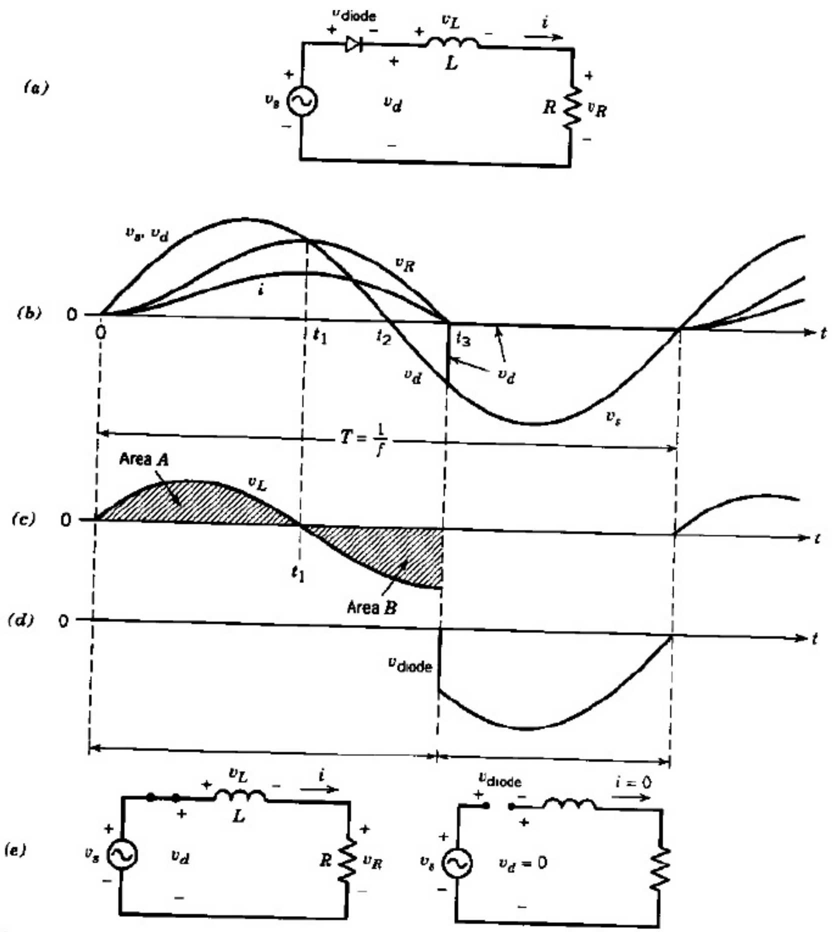
$$V_{Ueff} = V_M\sqrt{\frac{6}{T}\int_{\frac{2T}{12}}^{\frac{4T}{12}} \sin^2(\omega t)\,dt} = V_M\sqrt{\frac{3}{T}\int_{\frac{2T}{12}}^{\frac{4T}{12}} (1-\cos(2\omega t))\,dt} =$$

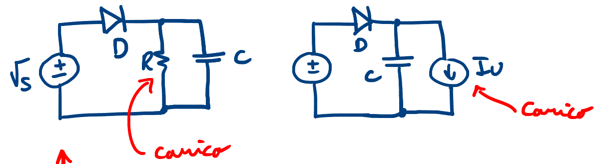
$$= V_M\sqrt{\frac{3}{T}\left(\frac{T}{6} + \frac{\sqrt{3}}{2\omega}\right)} = V_M\sqrt{\frac{1}{2} + \frac{3\sqrt{3}}{4\pi}} = 0.9958 \cdot V_M$$

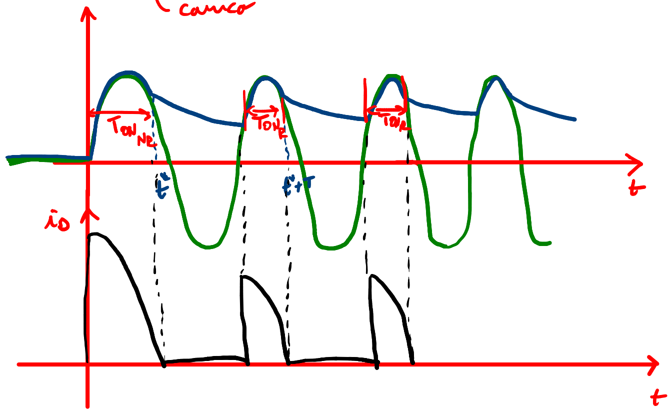
$$RF = \frac{\sqrt{V_{Ueff}^2 - V_u^2}}{V_u} = 0.04197 \qquad \eta_R = \frac{V_u^2}{V_{Ueff}^2} = 0.9982$$

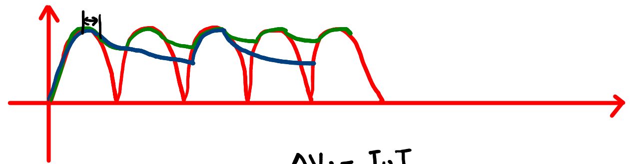


$$v_U(j\omega) = \frac{R}{R + LRj\omega} V_s(j\omega)$$

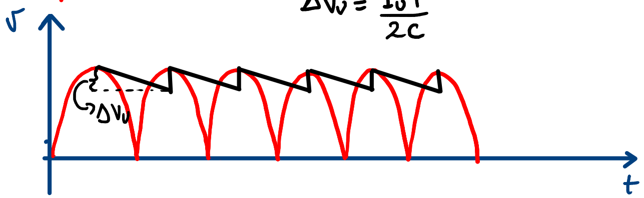








$$\Delta V_U = \frac{I_U T}{2C}$$



$$V_U = V_m - \frac{\Delta V_U}{2} = V_m - \underbrace{\left(\frac{T}{4C}\right)}_{R_R} I_U$$

$$V_{Ueff} = \sqrt{\frac{2}{T}\int_0^{\frac{T}{2}}\left(V_m - \frac{I_U}{C}t\right)^2 dt} = \sqrt{V_m^2 - 2V_m R_R I_U + \frac{4}{3}(R_R I_U)^2}$$

$$RF = \frac{\sqrt{V_{Ueff}^2 - V_U^2}}{V_U} = \frac{R_R I_U}{\sqrt{3}\,(V_m - R_R I_U)}$$