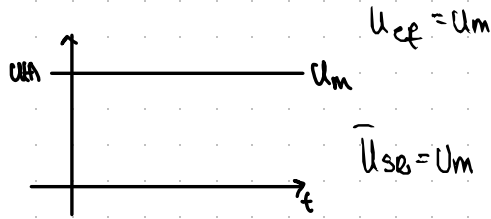


8. GRAFOVI PERIODIČNIH FUNKCIJA

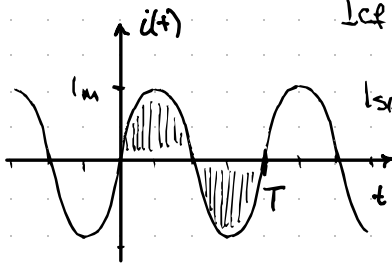
Istosmjerni



$$U_{ef} = U_m$$

$$U_{se} = U_m$$

Sinusni



$$I_{ef} = \frac{I_m}{\sqrt{2}}$$

$$I_{se} = 0 \text{ (ponišk se površine)}$$

kad se unosi
sinus onda
dobijemo $\sqrt{2}$

da se dobijemo 0
koristimo imenu

FORMULE

$$Y_{ef} = \sqrt{\frac{1}{T} \int_0^T y^2(t) dt}$$

$$Y_{se} = \frac{1}{T} \int_0^T y(t) dt$$

$$Y_{se} = Y_{se0} \frac{T_1}{T}$$

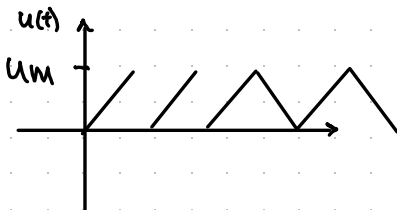
$$Y_{ef} = Y_{ef0} \sqrt{\frac{T_1}{T}}$$

sinusnog oblika

$$Y_{ef} = \sqrt{Y_{ef1}^2 + Y_{ef2}^2 + \dots + Y_{efn}^2}$$

- otpornicima je svoj prolazi li kroz njih +/- struja
→ on se grije i radi svoje u oba slučaja

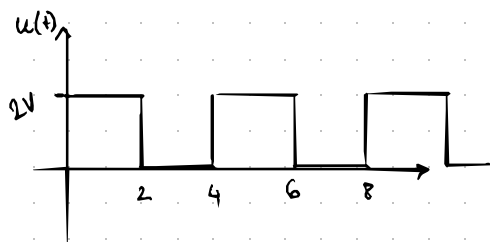
Pilasti



$$U_{ef} = \frac{U_m}{\sqrt{3}}$$

$$U_{se} = \frac{U_m}{2}$$

Grafovi s pauzom



$U_{ef} = ?$

$U_{se} = ?$

$$Y_{SR} = Y_{SR0} \frac{T_1}{T}$$

$$Y_{ef} = Y_{ef0} \sqrt{\frac{T_1}{T}}$$

$$Y_{ef} = \sqrt{Y_{ef1}^2 + Y_{ef2}^2 + \dots + Y_{efn}^2}$$

$$\rightarrow U_{ef} = 2V \cdot \sqrt{\frac{2}{4}} = \underline{\underline{2 \cdot \sqrt{\frac{1}{2}}}}$$

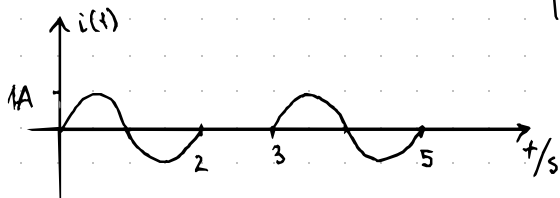
$$U_{se} = 2V \cdot \frac{1}{2} = \underline{\underline{1V}}$$

→ taj oblik se ponavlja nakon 4s

$T = 4s$ τ = koliko taj oblik traje u tih 4s

$\tau = 2s$

- osnovni oblik je sinusni



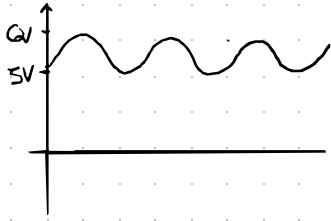
$T = 3s$

$\tau = 2s$

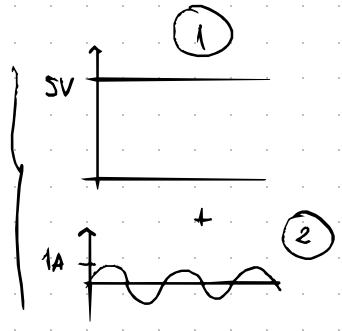
$I_{ef} = (\text{osnovni oblik je sin} \rightarrow \text{uzimamo } \sqrt{2})$

$$I_{ef} = \frac{1A}{\sqrt{2}} \cdot \sqrt{\frac{2}{3}} = \underline{\underline{\frac{1}{\sqrt{3}} A}}$$

SLOŽENI OBLICI



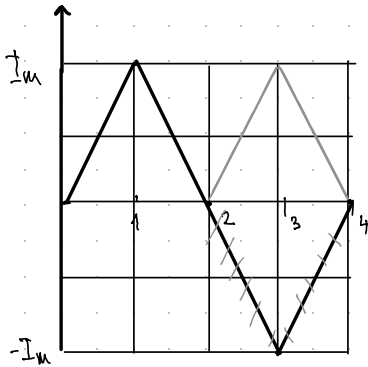
→ $u(t) = 5 + 1 \sin(\omega t)$
sinus pomaknut gore
↳ istosmjerni + sinusni



$$\left. \begin{array}{l} U_{f1} = 5V \\ U_{f2} = \frac{1}{\sqrt{2}} \end{array} \right\} \text{ zbrojiti: } U_{ef} = \sqrt{U_{ef1}^2 + U_{ef2}^2 + \dots + U_{efn}^2}$$

$$= U_{ef} = \sqrt{5^2 + \left(\frac{1}{\sqrt{2}}\right)^2}$$

JESEN 18/19. (14)



$$I_m = 3 \text{ mA}$$

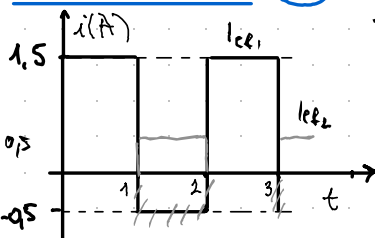
⇒ kad prebacujemo = PILASTI OBLIK

$$U_{ef} = \frac{U_m}{\sqrt{3}} \quad U_{sr} = \frac{U_m}{2}$$

$$U_{ef} = \frac{3}{\sqrt{3}} \text{ mA} \quad U_{sr} = \frac{3}{2} \text{ mA}$$

$$U_{ef} = 1.73 \text{ mA}$$

LJIR 18/19. (8)



→ ali ovo je oblik i pauzom

$$\left. \begin{array}{l} T_1 = 2 \\ f_1 = 1 \end{array} \right\} i_{ef1} = 1.5 \sqrt{\frac{1}{2}}$$

$$\left. \begin{array}{l} T_2 = 2 \\ f_2 = 1 \end{array} \right\} i_{ef2} = 0.5 \sqrt{\frac{1}{2}}$$

$$i_{ef} = \sqrt{i_{ef1}^2 + i_{ef2}^2}$$

$$i_{ef} = 1.12 \text{ A}$$

DoD 19./20. 8.

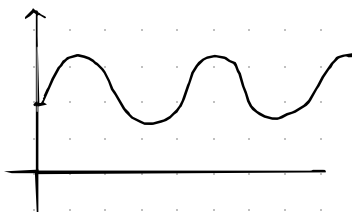
$$u(t) = 1 + u_1 \sin(\omega t) \text{ [V]}$$

$$U_{ef} = 5V$$

$$U_1 = ?$$

$$5 = \sqrt{1^2 + \left(\frac{U_1}{\sqrt{2}}\right)^2}$$

$$25 = 1 + \frac{U_1^2}{2} \Rightarrow U_1 = \sqrt{48} = 6,93V$$



$$\rightarrow u(t) = u \quad \& \quad u(t) = U_1 \sin(\omega t)$$

$$U_{ef1} = 1V$$

$$U_{ef2} = \frac{U_1}{\sqrt{2}}$$

DEK 18./19. 11.

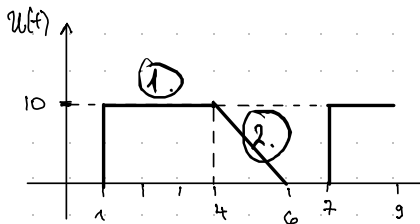
$$U_m = ?$$

$$u(t) = U_m \sin(\omega t)$$

$$R = 47 \Omega$$

$$U_{ef} = \frac{U_m}{\sqrt{2}}$$

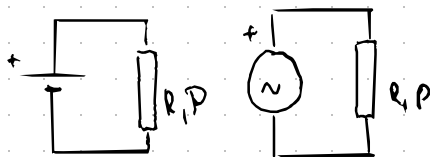
$$t = 1 \text{ min (topernu)}$$



* ako imamo dva strujna kruga s istim otporom

$$\begin{matrix} T_1 = 6 \\ T_1 = 3 \\ T_2 = 2 \end{matrix} \left\{ \begin{matrix} U_{ef1} = 10 \cdot \sqrt{\frac{1}{2}} \\ U_{ef2} = \sqrt{\frac{10}{3}} \sqrt{\frac{1}{3}} \end{matrix} \right.$$

(pilih oblik)



$$\frac{5}{\sqrt{2}}$$

$$5 \sin(\omega t)$$

$$\text{ako stavimo } U_m = 5V$$

$$U_{ef} = \sqrt{10^2 \cdot \frac{1}{2} + \frac{100}{3} \cdot \frac{1}{3}}$$

$$U_{ef} = 7,81V \quad (\text{dobili smo istosmerni spoj})$$

$$\rightarrow U_m = U_{ef} \cdot \sqrt{2}$$

$$U_m = 11V$$

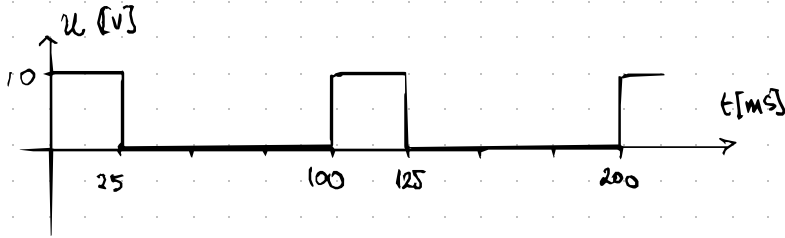
PP vrijednost u izmjenicnom

naponu će davati istu snagu P

ZIMA 19./20.

5.

$$R = 10 \Omega$$



$$T = 100 \text{ ms}$$

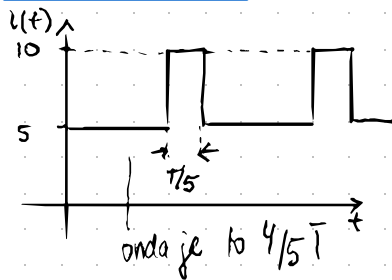
$$\tau = 25 \text{ ms}$$

$$U_{\text{ef}} = 10 \sqrt{\frac{1}{4}} = \underline{5 \text{ V}}$$

$$P = \frac{U^2}{R} = \frac{25}{10} = \underline{2,5 \text{ W}}$$

ZIMA 20./21.

2.



onda je to $\frac{4}{5} T$

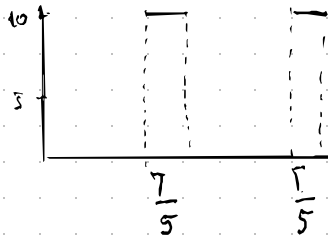
pomaknuti graf s porazom

$I_{\text{ef}}?$

razdvojimo na 2 istovremena
gafa

$$A_1 = 5$$

$$A_2 = 10$$



$$I_{\text{ef}_1} = 5 \sqrt{\frac{\frac{4}{5} T}{T}} = 5 \cdot \frac{2}{\sqrt{5}}$$

$$I_{\text{ef}_2} = 10 \cdot \sqrt{\frac{\frac{1}{5} T}{T}} = \frac{10}{\sqrt{5}}$$

$$I_{\text{ef}} = \sqrt{\frac{10^2}{5} \cdot 2} = \sqrt{\frac{200}{5}}$$

$$I_{\text{ef}} = \sqrt{40} = 2\sqrt{10} = \underline{6,32 \text{ A}}$$

WIR 19.10. (5.)

$$\xi = \frac{I_{ef}}{I_{sa}}$$

$$\xi = ?$$

$$I_{ef} = \frac{14}{\sqrt{3}} \sqrt{\frac{6}{7}} = 2\sqrt{14}$$

$$I_{sa} = \frac{14}{2} \cdot \frac{6}{7} = 6 \quad \frac{2\sqrt{14}}{6}$$

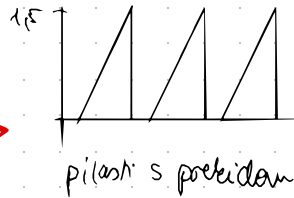
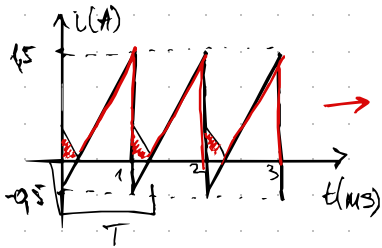
$$\xi = \frac{2\sqrt{14}}{6} = 1,25$$

→ osnovni oblik je pilast

$$T = 7$$

$$J = 6$$

11. 18/19.



pilast s prekidom

$$T = 1$$

$$J_m = \frac{T}{4} \quad J_v = \frac{3}{4}T$$

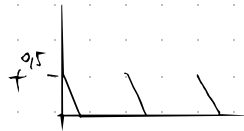
$$y = kx + l \rightarrow l = -0.5$$

$$k = \frac{\Delta y}{\Delta x} = \frac{15 - (-0.5)}{1} = 2$$

$$y = 2x - 0.5$$

$$y = 0 \rightarrow 2x = \frac{1}{2}$$

$$x = \frac{1}{4} \text{ to je } J$$



$$I_{ef1} = \frac{0.5}{\sqrt{3}} \sqrt{\frac{1}{\frac{3}{4}}} = \frac{0.5}{\sqrt{3}} \cdot \frac{1}{2}$$

$$I_{ef2} = \frac{1.5}{\sqrt{3}} \sqrt{\frac{3}{\frac{4}{1}}} = \frac{1.5}{\sqrt{3}} \cdot \frac{\sqrt{3}}{2}$$

$$I_{ef} = \frac{1.5}{2} A$$

$$I_{ef} = 0.76 A$$