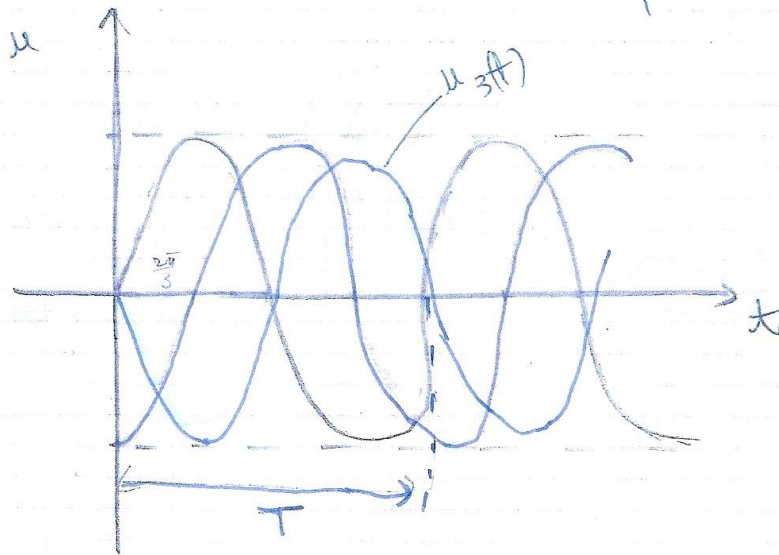
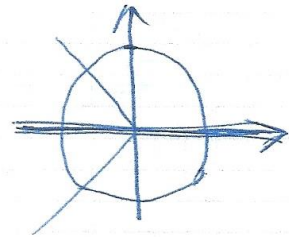


8.1. Sisteme trifazate simetrice

Un sistem trifazat simetric este un ansamblu ordonat de 3 mărimi sinusoidale având aceeași val. efectivă, aceeași frecvență și același defazaj.



$$u_1(t) = U\sqrt{2} \sin \omega t$$
$$u_2(t) = U\sqrt{2} \sin \left(\omega t + \frac{2\pi}{3} \right)$$
$$u_3(t) = U\sqrt{2} \sin \left(\omega t + \frac{4\pi}{3} \right)$$



$$a = e^{j \frac{2\pi}{3}} = \cos \frac{2\pi}{3} + j \sin \frac{2\pi}{3} = -\frac{1}{2} + j \frac{\sqrt{3}}{2}$$

$$a^2 = e^{j \frac{4\pi}{3}} = -\frac{1}{2} - j \frac{\sqrt{3}}{2}$$

Suma m\u0103rimitor unui sistem simetric este la orice moment 0.

$$\underline{U}_1 = U e^{j0}$$

$$\underline{U}_2 = U e^{-j \frac{2\pi}{3}} = a^2 U$$

$$\underline{U}_3 = U e^{-j \frac{4\pi}{3}} = a U$$

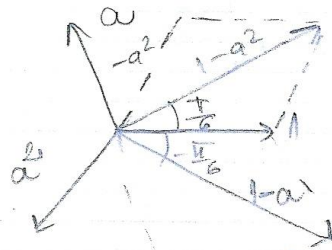
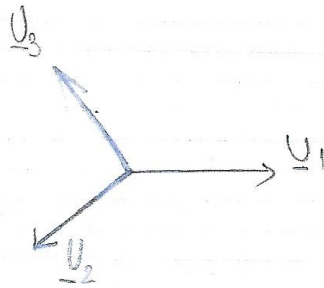
$$\underline{U}_1 = U$$

$$\underline{U}_2 = a^2 U$$

$$\underline{U}_3 = a U$$

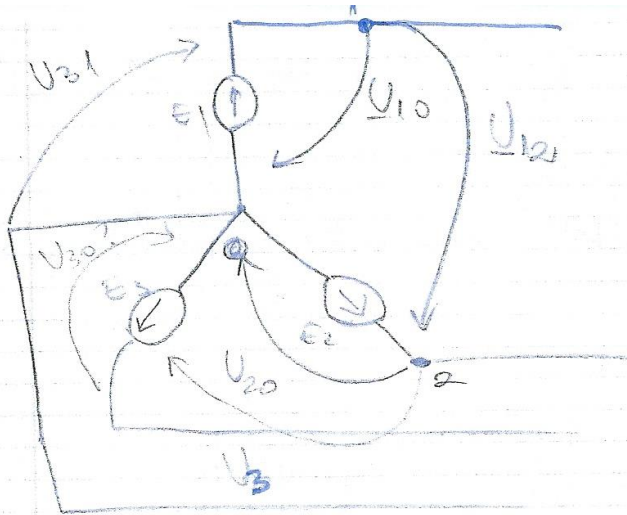
↳ Sist. de succesiune direct\u0103

$$\underline{U}_1 + \underline{U}_2 + \underline{U}_3 = U(1 + a^2 + a) = U \left(1 - \frac{1}{2} - j \frac{\sqrt{3}}{2} - \frac{1}{2} + j \frac{\sqrt{3}}{2} \right) = 0$$



$$1 - a^2 = 1 + \frac{1}{2} + j \frac{\sqrt{3}}{2} = \sqrt{3} \left(\frac{\sqrt{3}}{2} + j \frac{1}{2} \right) = \sqrt{3} e^{j \frac{\pi}{6}}$$

$$1 - a = 1 + \frac{1}{2} - j \frac{\sqrt{3}}{2} = \sqrt{3} \left(\frac{\sqrt{3}}{2} - j \frac{1}{2} \right) = \sqrt{3} e^{-j \frac{\pi}{6}}$$



Sist de

$$\left. \begin{aligned} \underline{U}_{10} &= U \\ \underline{U}_{20} &= a^2 U \\ \underline{U}_{30} &= a U \end{aligned} \right\} U_{\phi} \text{ (tensiune de fază)}$$

$$a^0 = 1$$

$$a = -\frac{1}{2} + j\frac{\sqrt{3}}{2}$$

$$a^2 = -\frac{1}{2} - j\frac{\sqrt{3}}{2}$$

$$a^3 = 1$$

$$\frac{a}{a^2} = \frac{1}{a} = \frac{a^3}{a^2} = a$$

Tens. de linie

$$\underline{U}_{12} = \underline{U}_{10} - \underline{U}_{20} = U - a^2 U = (1 - a^2) U = \sqrt{3} U e^{j\frac{\pi}{6}}$$

$$\underline{U}_{23} = \underline{U}_{20} - \underline{U}_{30} = a^2 U - a U = a^2 (U - a^2 U) =$$

$$= a^2 U \sqrt{3} e^{j\frac{\pi}{6}}$$

$$\underline{U}_{31} = \underline{U}_{30} - \underline{U}_{10} = a U - U = a (U - a^2 U) =$$

