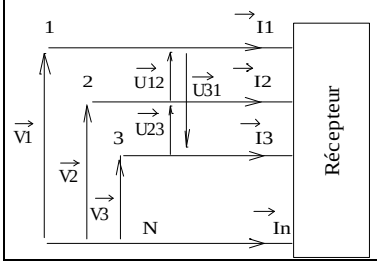
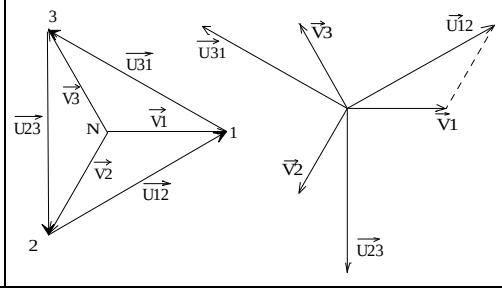
I. Définitions





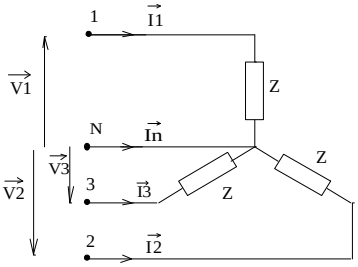
Les tensions $\vec{V}_1$, $\vec{V}_2$, $\vec{V}_3$ entre phase et neutre sont appelés *tensions simples* : $V_1=V_2=V_3=V$

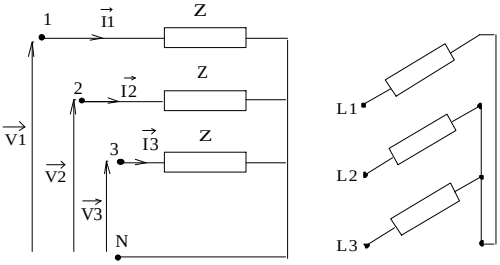
Les tensions $\vec{U}_{12}$, $\vec{U}_{23}$, $\vec{U}_{31}$ entre phases sont appelées *tensions composées* : $U_{12}=U_{23}=U_{31}=U$

U=√3V

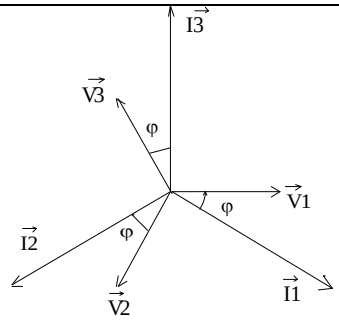
II. Montage étoile.

Z=[Z, φ] $I_1=I_2=I_3=I$ avec **I=V/ Z**



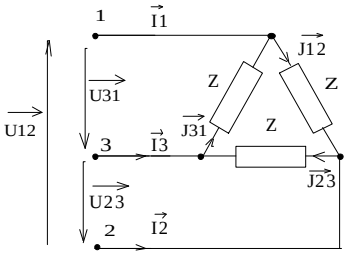


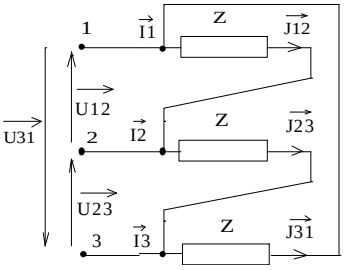
P=3VIcosφ = √3UIcosφ , Q=3VIsinφ = √3UIsin φ , S=3VI=√3UI

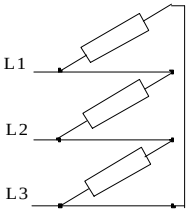


$(\vec{I}_1,\vec{V}_1)=(\vec{I}_2,\vec{V}_2)=(\vec{I}_3,\vec{V}_3)=\varphi$

III. Montage Triangle : Z=[Z, φ]

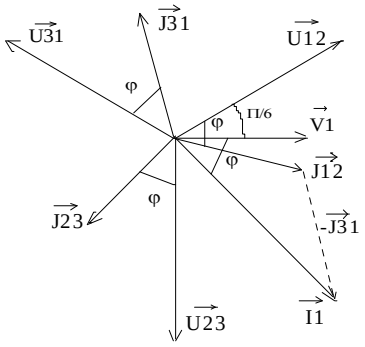






$J_{12}=J_{23}=J_{31}=J$ et **J=U/Z** $I_1=I_2=I_3=I$ et **I=J√3**

P=3UJcos φ = √3UIcos φ , Q=3UJsinφ = √3UIsin φ , S=3UJ=√3UI



$(\vec{J}_{12},\vec{U}_{12})=(\vec{J}_{23},\vec{U}_{23})=(\vec{J}_{31},\vec{U}_{31})=\varphi$

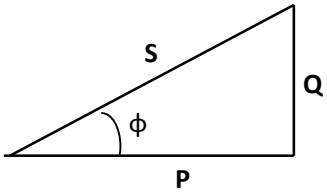
$(\vec{I}_1,\vec{V}_1)=(\vec{I}_2,\vec{V}_2)=(\vec{I}_3,\vec{V}_3)=\varphi$

IV. Bilan des Puissances .

Dans une installation :

Théorème de Boucherot donne :

P=ΣPi , Q=ΣQi

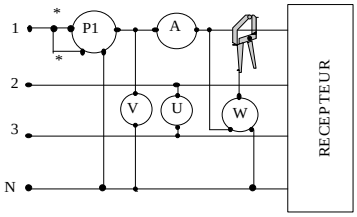


et **$S=\sqrt{P^2+Q^2}$**

tg φ = Q/P

V. Mesure des puissances .

Réseau 4 fils équilibré:



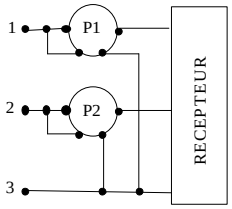
Utilisation d'un wattmètre monophasé ordinaire ou avec pince ampèremètrique :

$P = 3P_1$

$S = 3VI = \sqrt{3}.U.I = \sqrt{P^2+Q^2}$

VI. Relèvement du facteur de puissance

Réseau 3 fils équilibré :



Méthode des 2 wattmètres

P = P1+P2

Q =√3 (P1-P2)

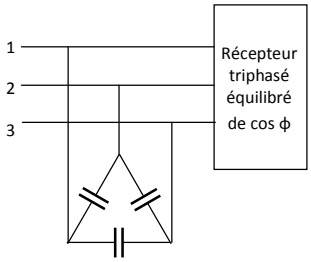
ou

P_{13}= U.I.cos(φ-π/6)

P_{23}= U.I.cos(φ+π/6)

Relèvement du cos φ:

Capacités en triangle :



$$C = \frac{P\,(tg\,\varphi - tg\,\varphi')}{3\omega U^2}$$

Capacités en étoile :

$$C = \frac{P\,(tg\,\varphi - tg\,\varphi')}{3\omega V^2}$$