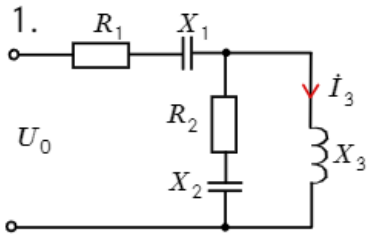
РГЗ

Простые цепи синусоидального тока. Непрямая задача

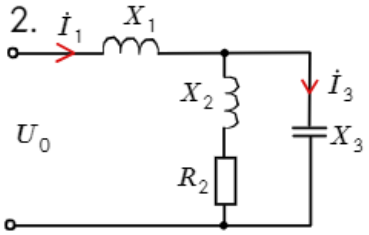
Задание: определить параметры схемы, токи и напряжения (в комплексах действующих значений), составить баланс мощности и построить векторные диаграммы напряжений и токов.

$Q_1 = 1000$ вар
$I_3 = 10\sqrt{2}$ А
$R_1 = R_2 = X_2 = 10$ Ом
$\phi_0 = 0$

1.



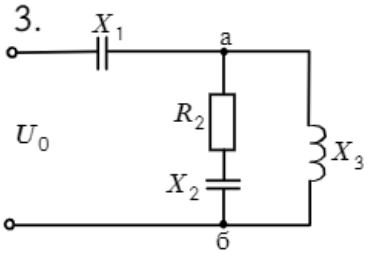
2.



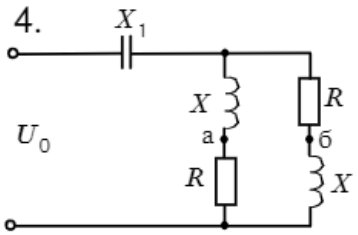
$U_0 = 100$ В
$I_1 = I_3 = 10$ А
$X_1 = 10$ Ом
$\psi_{u_0} - \psi_{i_2} = \pi/2$

$U_0 = 100\sqrt{2}$ В
$U_1 = U_{аб} = 100$ В
$Q_0 = 1000$ вар
$X_3 = 10$ Ом

3.



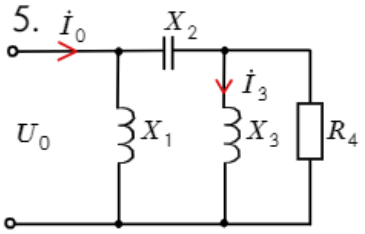
4.



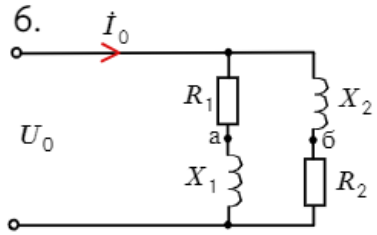
$P_0 = 2000$ Вт
$Q_0 = 2000$ вар
$U_0 = U_{аб}$
$X = 10$ Ом

$Q_0 = Q_1 = 2000$ вар
$\dot{I}_0 = 2\dot{I}_3$
$R_4 = 20$ Ом

5.



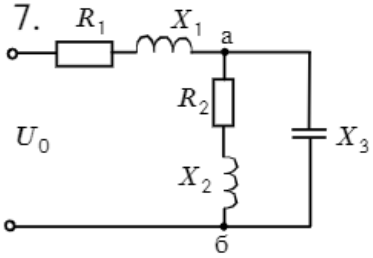
6.



$Q_0 = 400$ вар
$I_0 = 4\sqrt{2}$ А
$X_1 = R_2 = 10$ Ом
$\psi_{u_{аб}} - \psi_{u_0} = \pi/2$

$Q_0 = 120$ вар
$U_0 = U_{аб}$
$R_1 = X_1 = 10$ Ом
$R_2 = 30$ Ом
$X_2 = 40$ Ом

7.



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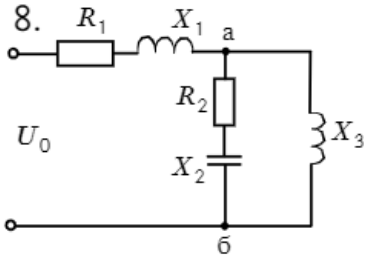
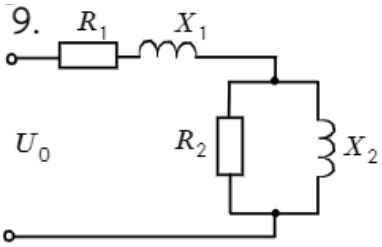


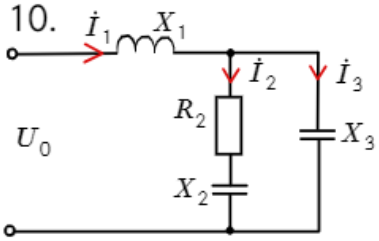
$P_0 = 100$ Вт
$R_1 = X_1 = 2X_3 = 50$ Ом
$\underline{Z}_2 = 10\sqrt{10}$ Ом
$\psi_{u_0} - \psi_{u_{аб}} = 0$

$P_2 = 3200$ Вт
$U_0 = 400$ В
$R_1 = 2$ Ом
$X_2 = 16$ Ом
$\cos\phi_2 = 0{,}707$

9.



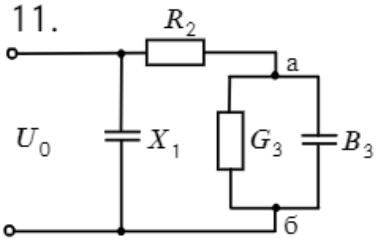
10.



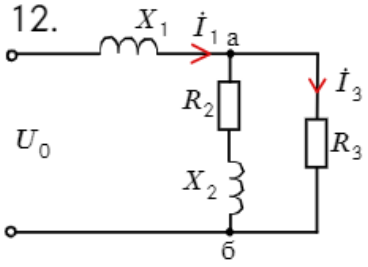
$Q_0 = 2000$ вар
$I_1 = 10\sqrt{5}$ А
$I_2 = 10$ А
$I_3 = 10\sqrt{2}$ А
$X_1 = 10$ Ом

$U_0 = 100\sqrt{10}$ В
$U_2 = 200$ В
$G_3 = B_3 = 4 \cdot 10^{-2}$ См
$\psi_{i_0} - \psi_{u_{аб}} = \pi/2$

11.



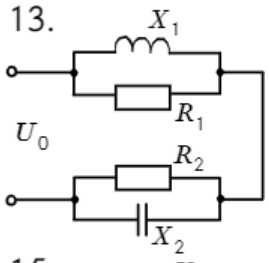
12.



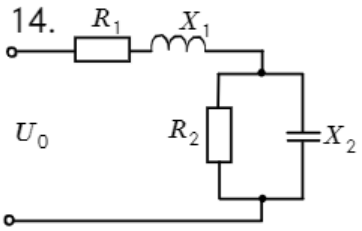
$I_1 = 10\sqrt{10}$ А
$I_3 = 20$ А
$R_2 = X_2 = 4$ Ом
$\psi_{u_0} - \psi_{i_2} = \pi/2$

$P_0 = 1200$ Вт
$U_2 = \sqrt{1{,}8}\,U_1$ В
$R_2 = 18$ Ом
$X_1 = 10$ Ом
$\phi_0 = 0$

13.



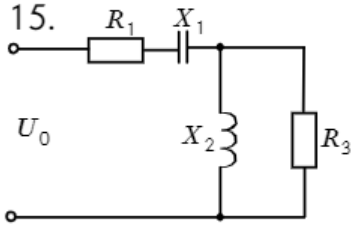
14.



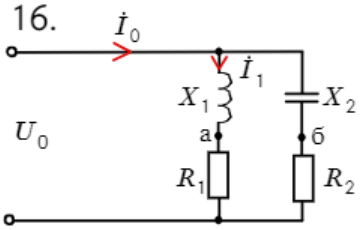
$P_0 = 1000$ Вт
$Q_2 = 1800$ вар
$X_1 = 2R_1 = 4$ Ом
$\phi_0 = -\pi/4$

$P_0 = 1000$ Вт
$Q_0 = 0$ вар
$U_0 = 200$ В
$U_1 = 50\sqrt{10}$ В
$U_2 = 50\sqrt{2}$ В

15.



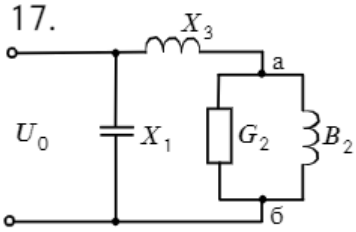
16.



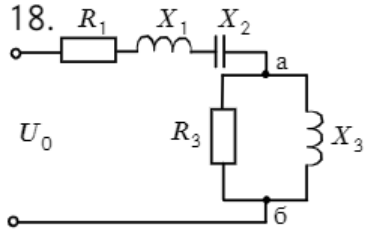
$Q_0 = 4000\sqrt{3}$ вар
$I_2 = 2I_1$
$X_1 = 10\sqrt{3}$ Ом
$R_1 = 10$ Ом
$\psi_{u_0} - \psi_{u_{аб}} = \pi/2$

$Q_0 = 3000$ вар
$U_1 = 100\sqrt{5}$ В
$U_{аб} = 100\sqrt{2}$ В
$U_3 = 100$ В
$X_1 = 10$ Ом

17.



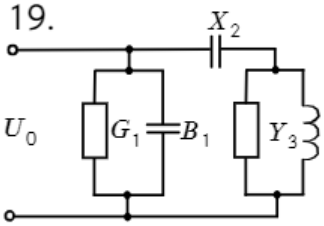
18.



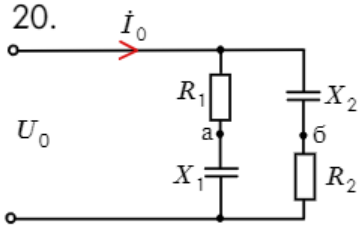
$P_0 = 1400$ Вт
$Q_0 = 200$ вар
$U_0 = U_{аб}$
$R_3 = X_3 = 5X_1 = 10$ Ом

$P_0 = 1000$ Вт
$G_1 = B_1 = 5 \cdot 10^{-2}$ См
$Y_3 = \sqrt{10} \cdot 10^{-2}$ См
$X_2 = 40$ Ом
$\psi_{i_0} - \psi_{i_2} = 0$

19.



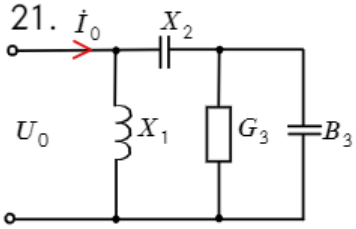
20.



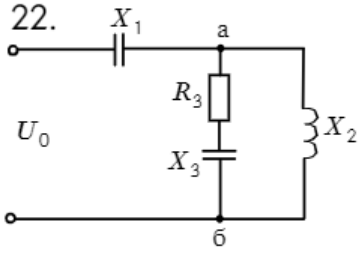
$Q_1 = 100$ вар
$I_0 = 4\sqrt{2}$ А
$X_1 = R_2 = 10$ Ом
$\psi_{u_0} - \psi_{u_{аб}} = \pi/2$

$I_0 = 10$ А
$X_1 = X_2 = Z_3 = 10\sqrt{2}$ Ом
$\psi_{u_2} - \psi_{i_0} = \pi/4$

21.



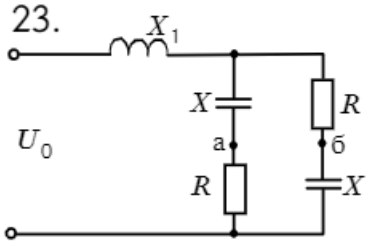
22.



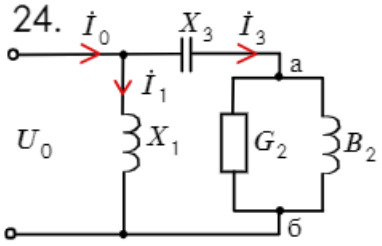
$Q_0 = Q_1 = 1000$ вар
$\dot{U}_0 = 2\dot{U}_3$
$R_3 = 10$ Ом

$Q_0 = 2000$ вар
$U_0 = U_{аб}$
$X = R = 10$ Ом

23.



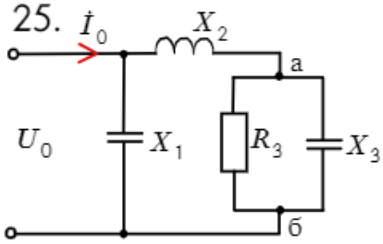
24.



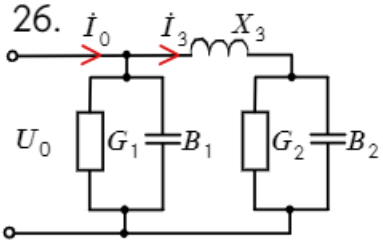
$Q_0 = 1000$ вар
$I_0 = 10\sqrt{2}$ А
$I_1 = I_3 = 10$ А
$X_3 = 10$ Ом

$U_1 = U_2 = 100$ В
$I_0 = 10$ А
$X_1 = 10$ Ом
$\psi_{i_0} - \psi_{u_{аб}} = \pi/2$

25.



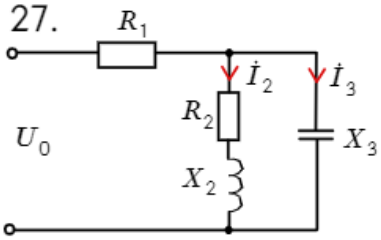
26.



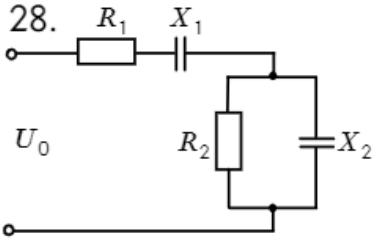
$Q_0 = 240$ вар
$I_0 = I_3$
$G_1 = B_1 = 0{,}1$ См
$G_2 = 0{,}3$ См
$B_2 = 0{,}4$ См

$U_0 = 120$ В
$I_3 = 2\sqrt{2}\,I_2$
$R_2 = X_2 = 4$ Ом
$\psi_{u_0} - \psi_{i_2} = \pi/2$

27.



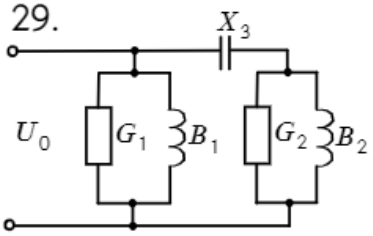
28.



$Q_2 = 2000$ вар
$U_0 = 240$ В
$R_1 = X_1 = 2$ Ом
$\cos\phi_2 = 0{,}705$

$Q_1 = 1000$ вар
$G_1 = G_2 = B_2 = 0{,}1$ См
$U_3 = 100\sqrt{2}$ В
$\phi_0 = 0$

29.



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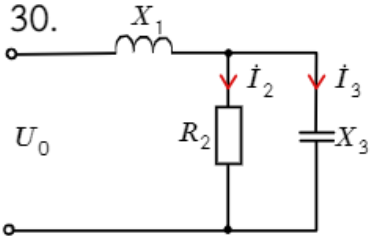

$U_0 = 100\sqrt{2}$ В
$I_2 = I_3 = 10$ А
$X_1 = 10$ Ом