POEL C9 : Podstawy metody wskazowej. Wyznaczanie immitancji. (odpowiedzi)

Zadanie 1. (a) $U = 10e^{-j\frac{\pi}{2}}$ [V] $= -j10$ [V], (b) $U = 10e^{j\frac{\pi}{3}}$ [V] $= 5 + j5\sqrt{3}$ [V], (c) $U = 5e^{-j\frac{\pi}{6}}$ [V] $= \frac{5\sqrt{3}}{2} - j\frac{5}{2}$ [V], (d) $U = \sqrt{7}e^{-j\arctan\frac{\sqrt{3}}{2}}$ [V] $= 2 - j\sqrt{3}$ [V], (e) $I = 1e^{j0}$ [A] $= 1\,\mathrm{A}$, (f) $I = 2e^{j0}$ [A] $= 2\,\mathrm{A}$, (g) $I = 12e^{-j12^\circ}$ [A] $= 12\cos 12^\circ - j12\sin 12^\circ$ [A], (h) $I = \sqrt{13 - 12\sin 31^\circ}\, e^{j\arctan\frac{\sqrt{2}+3\sin 14^\circ}{3\cos 14^\circ - \sqrt{2}}}$ [A] $= 3\cos 14^\circ - \sqrt{2} + j\left(\sqrt{2} + 3\sin 14^\circ\right)$ [A].

Zadanie 2. (a) $i(t) = -\sin\omega t\,[\mathrm{A}]$, (b) $i(t) = 10\cos\left(\omega t - \arctan\frac{4}{3}\right)$ [A], (c) $i(t) = -10\cos\left(\omega t + \arctan\frac{4}{3}\right)$ [A], (d) $i(t) = 12\cos\left(\omega t + 10^\circ\right)$ [A], (e) $u(t) = \frac{\sqrt{2}}{2}\cos\left(\omega t - \frac{\pi}{4}\right)$ [V], (f) $u(t) = -\sin\omega t\,[\mathrm{V}]$, (g) $u(t) = -\sin\omega t\,[\mathrm{V}]$, (h) $u(t) = 8\cos\left(\omega t + 45^\circ\right)$ [V], (i) $u(t) = 2\cos\left(\omega t - \frac{\pi}{3}\right)$ [V], (j) $u(t) = \sqrt{13}\cos\left(\omega t + \frac{\pi}{6} + \arctan\frac{3}{2}\right)$ [V], (k) $u(t) = \sqrt{7}\cos\left(\omega t + \arctan\frac{2\sqrt{3}}{3}\right)$ [V], (l) $u(t) = \sqrt{20 + 16\cos 35^\circ}\cos\left(\omega t + 40^\circ - \arctan\frac{\sin 35^\circ}{2+\cos 35^\circ}\right)$ [V]

Zadanie 3. (a) $Z = 20e^{j\frac{\pi}{3}}$ [Ω], (b) $Z = j\frac{18}{5}$ [Ω].

Zadanie 4. (a) $U = j250$ [V], $u(0) = 0\,\mathrm{V}$, $u(1\,\mathrm{ms}) = -250\sin 2$ [V], (b) $U = 800 + j128$ [V], $u(0) = 32\sqrt{641}\cos\left(\arctan\frac{4}{25}\right)$ [V], $u(1\,\mathrm{mS}) = 32\sqrt{641}\cos\left(2 + \arctan\frac{4}{25}\right)$ [V]

Zadanie 5. (a) $Z = R + j\omega L$, (b) $Z = \frac{R}{1+j\omega RC}$, (c) $Z = \frac{R+j\omega L}{1+j\omega RC-\omega^2 LC}$, (d) $Z = \frac{R+j\omega L-\omega^2 RLC}{1+j\omega RC}$, (e) $Z = \frac{R}{1+(R-r)j\omega C}$, (f) $Z = \frac{R+j\omega L}{1-j\omega gL}$.

Zadanie 6. (a) $I = \frac{JR(R+j\omega L)j\omega C}{R+(2R+j\omega L)(1+j\omega RC)}$, (b) $I = \frac{j\omega C_4 R_1 R_3 J-\omega^2 L_2 C_4(JR_3-E)}{R_1-\omega^2 L_2 C_4(R_1+R_3)+j\omega(L_2+C_4 R_1 R_3)}$, (c) $I = E\frac{(R_2-R_1)j\omega C-1}{2R_2-\omega^2 LC(R_1+R_2)+j\omega(L+2R_1 R_2 C)}$