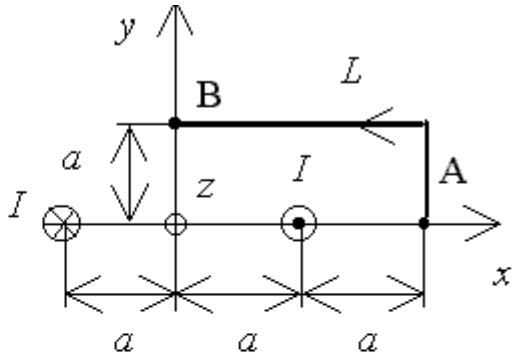
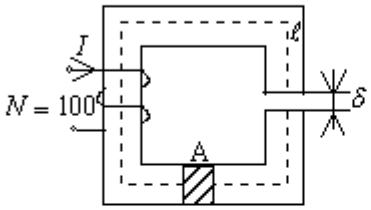
Kolikšna je magnetna napetost med točkama A in B vzdolž krivulje L v okolici dvovoda s tokom I = 2 A, (a = 1 m)?

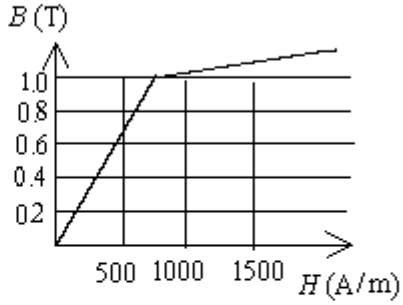


Rešitev:

$$\Theta_{AB} = \frac{-I}{2\pi}\cdot\frac{\pi}{4} + \frac{I}{2\pi}\cdot\frac{3\pi}{4} = \frac{I}{4} = 0.5\text{A}$$

Izračunajte magnetilni tok I tako, da bo magnetni pretok v reži $\Phi = 1.2 \cdot 10^{-3}\,\mathrm{Vs}$. Računajte s srednjo dolžino gostotnice in zanemarite stresanje ob reži (l = 0.5 m; $A = 20 \cdot 10^{-4}\,\mathrm{m}^2$, $\delta = 2\,\mathrm{mm}$).





Rešitev:

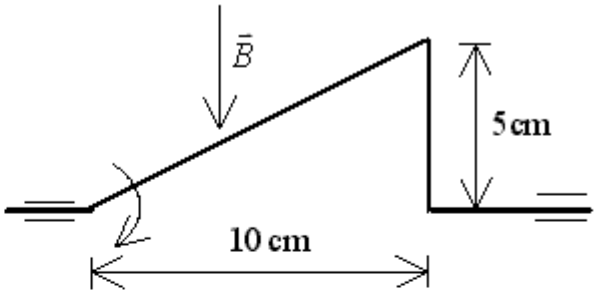
$$B = \frac{\Phi}{A} = \frac{1.2 \cdot 10^{-3}}{20 \cdot 10^{-4}} = 0.6\,\mathrm{T} \rightarrow H_{\mathrm{Fe}} = 400\,\mathrm{A/m}$$

$$H_0 = \frac{B}{\mu_0} = \frac{0.6}{4\pi \cdot 10^{-7}} = 477.5\,\mathrm{kA/m}$$

$$\Theta = N \cdot I = H_{\mathrm{Fe}} \cdot \ell + H_0\,\delta$$

$$I = \frac{1}{N}\left(H_{\mathrm{Fe}}\,\ell + H_0\,\delta\right) = \frac{1}{100}\left(400 \cdot 0.5 + 477.5 \cdot 10^3 \cdot 2 \cdot 10^{-3}\right) = 11.55\,\mathrm{A}$$

Kovinska trikotna kontura se vrti z n =3000 v/min okrog osi, ki je pravokotna na magnetno polje gostote $|\vec{B}| = 0.5T$. Kolikšna je inducirana napetost v konturi?



Rešitev:

$$u_i = -\frac{d\Phi}{dt}$$

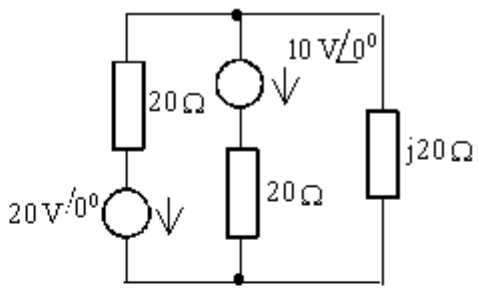
$$\omega = \frac{2\pi n}{60} = \frac{2 \cdot \pi \cdot 3000}{60} = 314\, s^{-1}$$

$$\Phi = |B| A \cdot \cos(\omega t + \varphi_0)$$

$$u_i = |B| A\, \omega \cdot \sin(\omega t + \varphi_0) = 0.5 \cdot \frac{0.1 \cdot 0.05}{2} \cdot 314 \sin(314 t + \varphi_0)$$

$$u_i = 0.393 \sin(314 t + \varphi_0)\, \mathrm{V}$$

Kolikšna je navidezna moč na impedanci $\underline{Z} = \mathrm{j}\,20\,\Omega$ v danem vezju?



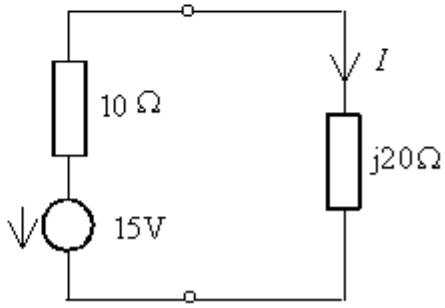
Rešitev:

Vezje poleg j20Ω nadomestimo z nadomestnim virom.

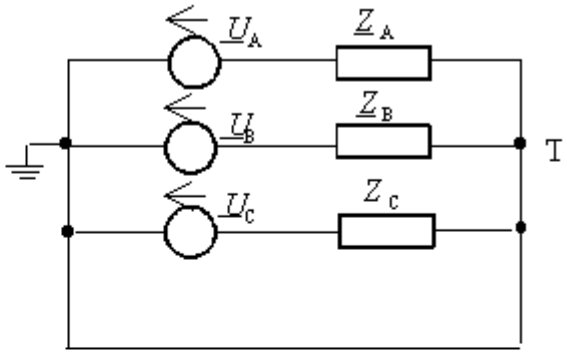
$\underline{U}_0 = 15\mathrm{V}, \quad \underline{Z}_0 = 10\,\Omega$

$Q = \underline{I}^2 \cdot \mathrm{j}\,20 = \left(\frac{15}{10 + \mathrm{j}20}\right)^2 \mathrm{j}20$

$Q = \mathrm{j}\,9\ \mathrm{VAr}$



Na simetrični trifazni generator z napetostjo faze A, $\underline{U}_A = 230\ \mathrm{V}$, je priključeno nesimetrično breme z impedancami $\underline{Z}_A = \mathrm{j}200\ \Omega$, $\underline{Z}_B = -\mathrm{j}100\ \Omega$, $\underline{Z}_C = 100\ \Omega$. Določite tok v nevtralnem vodniku in potencial zvezdišča T pri prekinitvi nevtralnega vodnika!



Rešitev:

$$\underline{I}_0 = \frac{\underline{U}_A}{\underline{Z}_A} + \frac{\underline{U}_B}{\underline{Z}_B} + \frac{\underline{U}_C}{\underline{Z}_C}$$

$$\underline{I}_0 = \frac{230}{\mathrm{j}200} + \frac{230e^{-\mathrm{j}120^0}}{-\mathrm{j}100} + \frac{230e^{-\mathrm{j}240^0}}{100}$$

$$\underline{I}_0 = 0.84 - \mathrm{j}\ 0.31\ \mathrm{A}$$

$$\underline{V}_T = \underline{I}_0 \frac{1}{1/\underline{Z}_A + 1/\underline{Z}_B + 1/\underline{Z}_C} = 54.8 - \mathrm{j}58.4\ \mathrm{V}$$