Př. 2 a) – pokračování

Pro jednodušší výpočty nahradíme impedance admitancemi

$$\bar{Y}_U = \frac{1}{\bar{Z}_U}\ ,\quad \bar{Y}_V = \frac{1}{\bar{Z}_V}\ ,\quad \bar{Y}_W = \frac{1}{\bar{Z}_W}\ ,\quad \bar{Y}_N = \frac{1}{\bar{Z}_N}$$

a dosadíme do rovnice 1. kirchhoffova zákona pro uzel O_2:

$$-\bar{Y}_U(\bar{U}_{oU} - \bar{U}_N) - \bar{Y}_V(\bar{U}_{oV} - \bar{U}_N) - \bar{Y}_W(\bar{U}_{oW} - \bar{U}_N) + \bar{Y}_N\bar{U}_N = 0$$

$$-\bar{Y}_U\bar{U}_{oU} + \bar{Y}_U\bar{U}_N - \bar{Y}_V\bar{U}_{oV} + \bar{Y}_V\bar{U}_N - \bar{Y}_W\bar{U}_{oW} + \bar{Y}_W\bar{U}_N + \bar{Y}_N\bar{U}_N = 0$$

$$\bar{U}_N(\bar{Y}_U + \bar{Y}_V + \bar{Y}_W + \bar{Y}_N) = \bar{Y}_U\bar{U}_{oU} + \bar{Y}_V\bar{U}_{oV} + \bar{Y}_W\bar{U}_{oW}$$

$$\bar{U}_N = \frac{\bar{Y}_U\bar{U}_{oU} + \bar{Y}_V\bar{U}_{oV} + \bar{Y}_W\bar{U}_{oW}}{\bar{Y}_U + \bar{Y}_V + \bar{Y}_W + \bar{Y}_N}$$

Hledané proudy:

$$\bar{I}_U = \frac{\bar{U}_U}{\bar{Z}_U} = \frac{\bar{U}_{oU} - \bar{U}_N}{\bar{Z}_U}$$

$$\bar{I}_V = \frac{\bar{U}_V}{\bar{Z}_V} = \frac{\bar{U}_{oV} - \bar{U}_N}{\bar{Z}_V}$$

$$\bar{I}_W = \frac{\bar{U}_W}{\bar{Z}_W} = \frac{\bar{U}_{oW} - \bar{U}_N}{\bar{Z}_W}$$

$$\bar{I}_N = \frac{\bar{U}_N}{\bar{Z}_N} \quad \text{nebo} \quad \bar{I}_N = \bar{I}_U + \bar{I}_V + \bar{I}_W$$

b) $\bar{Z}_U, \bar{Z}_V, \bar{Z}_W$, $\bar{Z}_U \neq \bar{Z}_V \neq \bar{Z}_W$, $\bar{Z}_N \to \infty \Rightarrow \bar{Y}_N = 0$

nulový vodič není vyveden (nebo je přerušen)

fázory napětí zdrojů $\bar{U}_{oU}, \bar{U}_{oV}, \bar{U}_{oW}$

$$\bar{U}_N = \frac{\bar{Y}_U\bar{U}_{oU} + \bar{Y}_V\bar{U}_{oV} + \bar{Y}_W\bar{U}_{oW}}{\bar{Y}_U + \bar{Y}_V + \bar{Y}_W}$$

$\Rightarrow \bar{U}_N$ je největší

$\bar{U}_N >$ než s nulovým vodičem

vliv nesymetrie se projeví nejvíce.

c) $\bar{Z}_U, \bar{Z}_W, \bar{Z}_V$, $\bar{Z}_U \neq \bar{Z}_V \neq \bar{Z}_W$, $\bar{Z}_N = 0 \Rightarrow \bar{Y}_N \to \infty$

fázory napětí zdrojů $\bar{U}_{oU}, \bar{U}_{oV}, \bar{U}_{oW}$ (nulový vodič je dokonalý)

$$\bar{U}_N = 0$$

$$\bar{I}_U = \frac{\bar{U}_{oU}}{\bar{Z}_U}\ ,\quad \bar{I}_V = \frac{\bar{U}_{oV}}{\bar{Z}_V}\ ,\quad \bar{I}_W = \frac{\bar{U}_{oW}}{\bar{Z}_W}\ ,\quad \bar{I}_N = \bar{I}_U + \bar{I}_V + \bar{I}_W$$