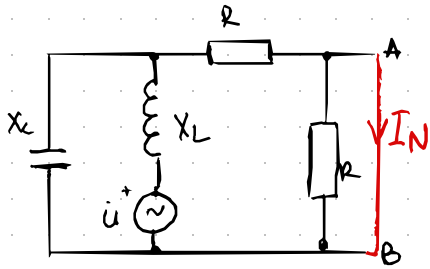
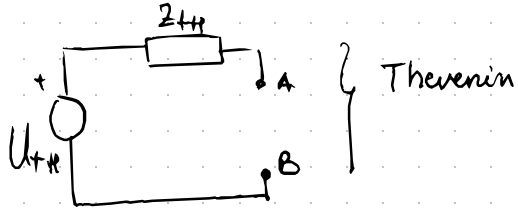


12. NORTON

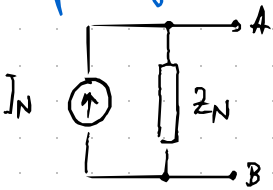
Primer: WIR 19./20. 1) Naći parametre



* kada vidimo Nortona \rightarrow radimo Theveninove om u JEDNOM POSEBNOM SLUČAJU



Norton je samo pretvorba naponskog izvora u strujni izvor



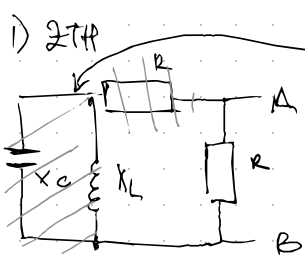
$$I_N = \frac{U_{TH}}{Z_{TH}}, \quad Z_N = Z_{TH}$$

$$I_{KS} = \frac{E}{R_i}$$

* inače kod Thevenina odspojimo i napravimo prazan hod

↳ kod Nortona kratko spojimo A i B
• tu teče Nortonska struja

1) Thevenin način: $X_C = X_L = R$



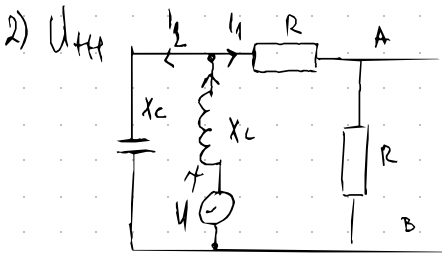
$$Z_{par} = \left(\frac{1}{X_C} + \frac{1}{X_L} \right)^{-1} = \left(\frac{-j}{R} + \frac{j}{R} \right)^{-1} = (\infty)^{-1}$$

$$Z_{par} = \infty$$

$$Z_{TH} = R = Z_N$$

(ne teče nikakva struja ($Z = \infty$))

$$\frac{-j+2}{-j2R}$$



$$I_{uk} = I_1 + I_2 \Rightarrow \frac{Z_{uk}}{U_{uk}} = \frac{Z_1}{U_{uk}} + \frac{Z_2}{U_{uk}}$$

$$Z_{uk} = Z_1 + Z_2$$

$$Z_{uk} = jX_L + \left[\frac{1}{2R} + \frac{1}{jX_C} \right]^{-1} = jR + \left[\frac{1}{2R} + \frac{1}{-jR} \right]^{-1}$$

$$Z_{uk} = jR - \frac{2jR}{-j+2} = R \left(j - \frac{2j}{-j+2} \right)$$

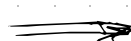
$$Z_{uk} = R \left(\frac{2}{5} + \frac{1}{5}j \right)$$

$$I_{uk} = \frac{U}{Z_{uk}} = \frac{U}{R(0,4 + 0,2j)}$$

$$I_1 = I_{uk} \cdot \frac{jR}{-jR + 2R} = I_{uk} \cdot \frac{-j}{2-j} = \frac{U}{R} \cdot \frac{1}{(0,4 + 0,2j)} \cdot \frac{-j}{2-j} = \frac{U}{R} (-j)$$

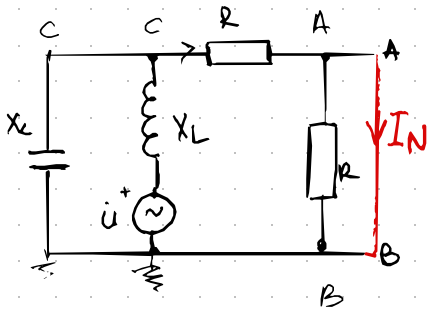
$$I_1 = -j \frac{U}{R} \rightarrow U_{TH} = I \cdot Z_{TH} = -j \frac{U}{R} R$$

$$U_{TH} = -jU$$



$$I_N = \frac{jU}{R}$$

1. Millman način napona



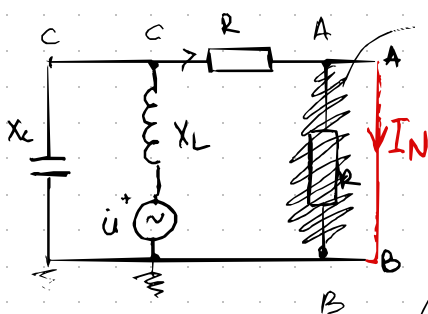
Po Millmanu

$$u_{CB} = \frac{\frac{u}{jR}}{\frac{1}{2R} + \frac{1}{jR} + \frac{1}{jR}} = -j2u$$

$$I_1 = \frac{u_{CB}}{2R} \rightarrow u_{AB} = I_1 \cdot R$$

$$u_{AB} = \frac{u_{CB}}{2} = \underline{\underline{-j u}}$$

2) Norton način



kratko spreg $I_1 = I_N$

→ preko strujnog djelika

$$Z_{uk} = \left(\frac{1}{R} + \frac{1}{jR} \right)^{-1} + jR$$

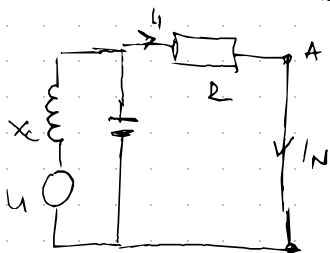
$$= \frac{-jR}{1-j} + jR = R \left(\frac{-j}{1-j} + j \right)$$

$$Z_{uk} = R \cdot (0,5 + 0,5j)$$

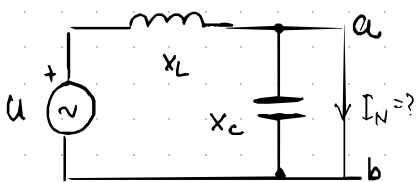
$$I_{uk} = \frac{u}{Z_{uk}} = \frac{u}{R(0,5 + 0,5j)}$$

$$I_1 = I_{uk} \cdot \frac{jR}{-jR + R} = \frac{j}{1-j} \cdot I_{uk}$$

$$I_1 = \frac{(-0,5 + 0,5j) \cdot u}{R(0,5 + 0,5j)} = \underline{\underline{-j \frac{u}{R} = I_N}}$$



2) 21.10/20. 20) Moduli Nortonove struje i impedancije



$$X_L = j20 \, \Omega$$

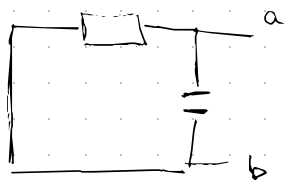
$$X_C = -j20 \, \Omega$$

$$u = 20 \, V$$

Ovo je primjer
di brat MORAMO
NORTONA

1) pronaći ćemo prvo preko Theveninima

Z_{TH}

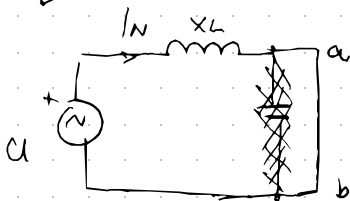


$$Z_{TH} = (0)^{-1} = \infty$$

$$I_N = \frac{U_{TH}}{\infty} \Rightarrow \text{zato ne možemo jer bi došli 0 A}$$

→ NORTON

$$Z_{TH} = \infty$$



$$I_N = \frac{u}{jX_L} = \frac{20}{j20} = -j \, A$$

$$|I_N| = 1$$

$$Z_{TH} = Z_N = \infty$$

Kada je $Z_{TH} = \infty$, onda moramo
na Nortonu, ostalo preko Theveninima.