Problème 1:

$B_{max} = 1{,}3T$

$i = 1.5A$

$N = 800$ spires

a) $H = \frac{NI}{l}$

$H = \frac{800 \cdot 1.5}{0.4}$

$H = 3000\ A/m$

b) I1 est beaucoup plus magnétique Puisque celui-ci atteint sa saturation de 1.3T beaucoup plus rapidement le courant sera de 0.14 A pour atteindre la même saturation

c) $295.5 = \frac{800 \cdot 1.5}{l}$

$l = \frac{800 \cdot 1.5}{295.5}$

$l = 4.06\ m$

d) on peut dire que l'amplitude est inversement proportionnelle à la longueur de l'entrefer

Problème 2:

$N = 277$ spires

$V_{eff} = 240V$

$f = 60\ Hz$

a) $E = N\frac{\Delta\Phi}{\Delta t}$ $\quad \Phi = B \cdot S$

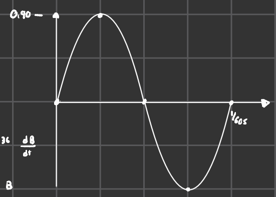
$E = N \cdot S \cdot \frac{dB}{dt}$

$339 \cdot \cos(120\pi t) = 277 \cdot 0.0036\ \frac{dB}{dt}$

$\int 339 \cos(120\pi t)\, dt = 277 \cdot 0.0036\ B$

$\frac{339 \sin(120\pi t)}{120\pi} = 277 \cdot 0.0036 \cdot B$

$0.90 \sin(120\pi t) = B$



b) $E_{eff} = \pi f N \Phi_{max}$

$\frac{240}{\sqrt{2}} = \pi 60 \cdot 277 \cdot \Phi_{max}$

$\Phi_{max} = 3{,}25\ mWb$

$\Phi = B \cdot S$

$3{,}25\ mWb = B \cdot 0{,}0018$

$B = 1{,}80\ T$

c) $B = 0{,}9$

$H = 132$

$132 = \frac{277 \cdot I}{0{,}4}$

$I = 0.19A$

$I_{eff} = 0{,}19/\sqrt{2} = 0{,}13\ A$

d) $P_{fer} = \frac{10}{8} \cdot 20 = 25$

$I_{fer} = \frac{P}{V_{eff}} = \frac{25}{240} = 0{,}1047$

e)

Problème 3:

$f = 60\ Hz$

CO

1) $E_{p\,eff} = 347V$

$E_{s\,eff} = 120V$

$I_{p\,eff} = 4A$

$P_{pr} = 300W$

CC au pr:

2) $E_{s\,eff} = 12V$

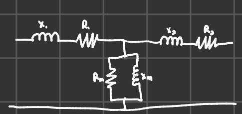
$I_{s\,eff} = 50A$

$P_s = 500W$

$a = \frac{347}{120} = 2{,}89$

$a' = 0{,}3458$

a)



$R_m = 401\ \Omega$

$X_m = 88.86\ \Omega$

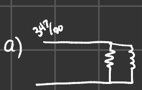
$R_1 = 0.84\ \Omega$

$R_2 = 0.1\ \Omega$

$X_2 = 0{,}066\ \Omega$

$X_1 = 0{,}5738\ \Omega$

a)



$P = \frac{E^2}{R}$

$\frac{347^2}{300} = R$

$R = 401\ \Omega$

$R_m = 401\ \Omega$

$Q = \sqrt{S^2 - P^2}$

$Q = \sqrt{(347 \cdot 4)^2 - 300^2}$

$Q = 1355$ var

$1355 = \frac{347^2}{X_m}$

$X_m = 88.86$

$\frac{500}{50^2} = R$

$R = 0.2$

$\frac{R_s}{2} = R_2$

$R_2 = 0.1$

$\frac{0.1}{0.3458^2} = R$

$R = 0.836$

$Q = \sqrt{S^2 - P^2}$

$Q = \sqrt{(12 \cdot 50)^2 - 500^2}$

$Q = 331.66$

$\frac{331.66}{50^2} = X_s$

$X_s = 0{,}13266$

$0.066 = X_2$

$\frac{0.066}{0{,}34^2} = X_1 = 0{,}5738$

b) $0{,}84 + 0{,}1J + \left(\frac{1}{\frac{1}{401} + \frac{1}{88{,}86J}} \right)$

$\frac{1}{Z_m} = \frac{1}{401} + \frac{1}{88.86J}$

$\frac{1}{Z_m} = 0.00249 - 0.01125J$

$Z_m = \frac{1}{0.00249 - 0.01125J}$

$Z_m = \frac{1}{0.00249 - 0.01125J} \cdot \frac{(0.00249 + 0.01125J)}{(0.00249 + 0.01125J)}$

$Z_m = \frac{0.00249 + 0.01125J}{6.2 \cdot 10^{-6} + 0.000126}$

$Z_m = \frac{0.00249 + 0.01125J}{0.000132762}$

$Z_m = 18.75 + 84.7J$ $\quad \sqrt{18.75^2 + 84.7^2} = 86.75$

$\tan^{-1}\left(\frac{84.7}{18.75}\right) = 77.51$

$E = ZI$

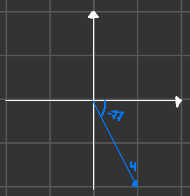
$\frac{E}{Z} = I$

$I = \frac{347\angle 0}{86.75\angle 77.5}$

$I = 4\angle -77.5$

b)

c)



Problème 4:

$a = \frac{315}{70} = 4.5$

$z = \frac{E}{I} = \frac{E^2}{S} = \frac{315\,000^2}{100\,000\,000} = 992.25\ \Omega$

$R_p = 0.005 \cdot 992 = 4.92$

$R_s a^2 = 0.015 \cdot 992 \cdot 4.5^2 = 301.32$

$X_{fp} = 0.015 \cdot 992 = 14.88$

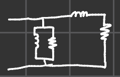
$X_{fs} = 0.02 \cdot 992 \cdot 4.5^2 = 401.76$

$X_m = 20 \cdot 992 = 19840$

$R_m = 100 \cdot 992 = 992000$

$R_{cn\,0^\circ} = 1417.5$

$X_{cn\,0^\circ} = 381.70$

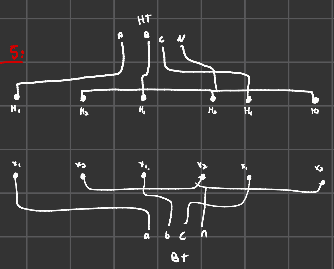


$\frac{1}{Z_m} = 1\times10^{-6} - 50.40 \cdot 10^{-6} J$

$\frac{1}{1\times10^{-6} - 50 \cdot 10^{-6} J} = \frac{1\times10^{-6} + 50 \cdot 10^{-6} J}{1\times10^{-12} + 25\times10^{-10}} = Z_m$

$399.80 + 19\,992\, J = Z_m$

Problème 5:



a)

c)

$S = 20\ KVA$

$S = 3 |I_P| |V_{PL-N}|$

$\frac{S}{3\ 347} = I_P = \frac{20\,000}{3 \cdot 347} = 19.21\ A$

Problème 6:

$a = \frac{14\,400}{120} = 120$

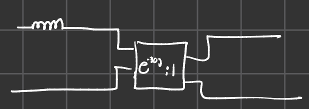
$S_{nom} = 1\,MVA$

$X_p = 0.15\ PU$

tri-ekle

$\angle 30^\circ$

a)



b)

Deuxième fois

Problème 1:

$B_{sat} = 1{,}3\,T$
$i = 1{,}5\,A$
$N = 800$ spires
$l = 0{,}40\,m$

a) $H = \frac{NI}{l}$

$H = \frac{800 \cdot 1{,}5}{0{,}40}$

$H = 3000$

b) Elle est en saturation car il est en saturation à partir de de 295,5 A/m

c)

d) Cela diminue le champ magnétique

Problème 2:

$N = 277$ spires
$V_{eff} = 240\,V$

a) $\sqrt{2}\,240\cos(120\pi t) = 277 \cdot 0{,}0036\,\frac{dB}{dt}$

$\int 339\cos(120\pi t)\,dt = 277 \cdot 0{,}0036\,B$

$\frac{339\sin(120\pi t)}{120\pi} = 277 \cdot 0{,}0036 \cdot B$

$0{,}901\,\sin(120\pi t) = B$

b) $240 = \pi\sqrt{2} \cdot 60 \cdot 277 \cdot \phi_{max}$

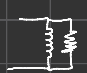
$\phi_{max} = 3{,}25\,mWB$

$\frac{0{,}00325}{0{,}0036} = 0{,}90$ au centre

$\frac{0{,}00325}{0{,}0018} = 1{,}80$ à gauche

Problème 3:

a)



$300 = \frac{E^2}{R_m}$

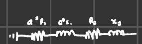
$R_m = 401\,\Omega$

$Q = \sqrt{(347.4)^2 - 300^2}$

$Q = 1355$

$1355 = \frac{347^2}{X_m}$

$X_m = 88{,}86\,\Omega$



$500 = 50^2 R_m$

$R_m = 0{,}2\,\Omega$

$0{,}2 = R_1 + R_2$

$R_1 = 0{,}1$

$\frac{120}{347} = Q = 0{,}3458$

$\frac{0{,}1}{0{,}34^2} = R_2$

$R_2 = 0{,}83$

$Q = \sqrt{(12 \cdot 50)^2 - 500^2}$

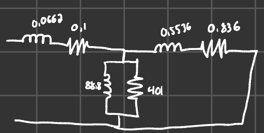
$Q = 331$

$\frac{331}{50^2} = X_m$

$X_m = 0{,}1324$

$X_1 = 0{,}0662$

$X_2 = 0{,}5536$



Problème 4:

$Z = \frac{E^2}{S}$

$a = \frac{315}{70} = 4{,}5$

$Z = \frac{315\,000^2}{100\,000\,000}$

$Z = 992{,}25$

$R_p = 0{,}005 \cdot 992{,}25 = 4{,}96$

$R_s = 0{,}015 \cdot 992{,}25 \cdot 4{,}5^2 = 301{,}32$

$X_p = 0{,}015 \cdot 992{,}25 = 14{,}88$

$X_s = 0{,}02 \cdot 992{,}25 \cdot 4{,}5^2 = 401$

$X_m = 20 \cdot 992{,}25 = 19\,840$

$R_m = 100 \cdot 992{,}25 = 99\,200$

$R_{charge} = 70 \cdot 4{,}5^2 = 1417$

$X_{charge} = 0{,}05 \cdot 2\pi 60 \cdot 4{,}5^2 = 381{,}70$

Problème 7:

$P = 20\,000\,W$

Charge $= 18\,000\,W$

$T° = 29°C$

Pertes $= 10\%$

sous $70°$

$1800 = 3A(70-29)^{1{,}25} = 5{,}78\,m^2$

$2000 = P_{perte}$

$P_{conv} = 2000 - 0{,}1 \cdot 2000$

$P_{conv} = 1800$