

ECE470 Power Systems I Hints for HW # 1

Problems 1, 2, and 3 are all three-phase, so:

$$I_B = \frac{S_B}{\sqrt{3}V_B}$$

Always assume three-phase unless you are told otherwise (as in problem 4.)

Selected answers:

1. $V = 1.2$ pu, $Z = 0.4$ pu
2. a) $Z = 0.75$ pu b) Z is slightly under 381Ω
3. a) $X_S = 0.0005$ pu b) $X_S = 1.25 \Omega$
4. b) $Q = 525$ kVAR d) $Z = 71.1 + j93.33 \Omega$

Note that S_B , P_B , and Q_B are dimensionally the same, i.e. MVA, MW, and MVAR are really the same units; they just tell you which side of the power triangle you are looking at.

On question 5, note that T_2 is three single-phase transformers and the rating of the bank is 10×3 MVA. Also, the Y-connection is 127 kV phase-neutral, so the base voltage is $\sqrt{3} \times 127$ kV.