

## ECE470 Power Systems I Hints for HW # 4

Selected answers:

1. a) 125 MVA      b)  $\delta = 55.8^\circ$      $\phi = -7.2^\circ$ .
2. a) 127  $\mu\text{H}/\text{km}$       b) 7.7 V/mile
3. a) 3.67  $\mu\text{H}/\text{km}$       b) 0.223 V/mile
4. Single-conductor  $X_C = 0.197 \text{ M}\Omega\text{-mile}$     Bundled-conductor  $X_C = 0.162 \text{ M}\Omega\text{-mile}$
5. Since the length is 50 km we can use the short line model and  $Z = R + jX_L$   
 $R = 10.63 \Omega$  and  $X_L = 20.24 \Omega$ 
  - a)  $S = 3.04 + j 2.91 \text{ MVA}$
  - b)  $S = 2.85 + j 0.66 \text{ MVA}$
  - c)  $S = 2.93 - j 0.39 \text{ MVA}$
6. a)  $R = 5.93 \Omega$      $X_L = 209 \Omega$      $X_C = 314.7 \Omega$  (Remember to use  $r$  and not  $r'$   
when calculating Capacitance).  
b) 1.4 kA