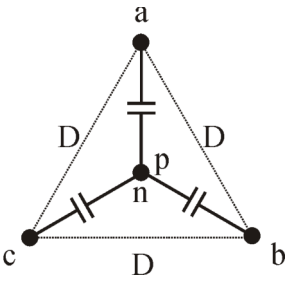
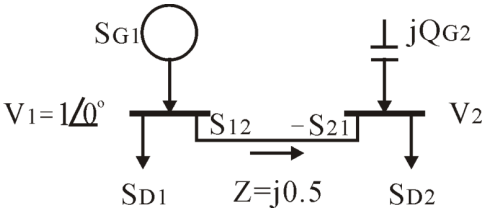
2022/05/31 電力工程導論　　姓名_____ 學號_____

1. (20) Assume that 1. conductors are equally spaced, D, and have equal radii r. 2. $q_a + q_b + q_c = 0$ ($c_a = c_b = c_c = c$, $v_a + v_b + v_c = 0$) 3. $i_a + i_b + i_c = 0$. Find (a) c=? (b) λ_a=?

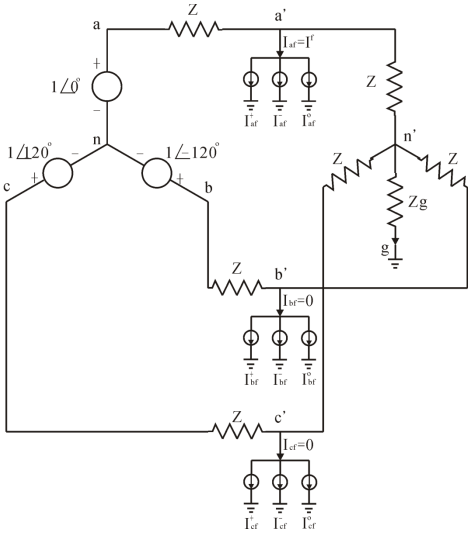


2. (20) A 60-Hz 138-kV 3Φ transmission line is 225mile long. The distributed line parameters are r =0.169 Ω/mile , l = 2.093 mH/mile , c = 0.01427 μF/mile , g = 0. The transmission line delivers 40 Mwat 132 kV with 95% power factor lagging. (a) Find the sending-end voltage and current. (b) Find the transmission line efficiency.

3. (20) $V_1 = 1\angle 0°$, $jQ_{G2} = j1.0$, $Z_L = j0.5$, $S_{D2} = P_{D2} + j1.0$. Find S_1 and V_2. We consider the solution as a function of P_{D2} for $P_{D2} \geqq 0$. (a) If $P_{D2} > 1 \Rightarrow V_2$ =? (b) If $P_{D2} = 1 \Rightarrow V_2$ =? (c) If $P_{D2} = 0.5 \Rightarrow V_2$ =?



4. (20) Fault current: $I^f = [I_{af}\ I_{bf}\ I_{cf}] = [I^f \quad 0 \quad 0]$. Find the symmetrical components of single line-to-ground faults currents.



5.(20) $v_a = 180 \cos \omega t$, $v_b = 180 \cos(\omega t - 120°)$, $v_c = 180 \cos(\omega t + 120°)$ (a) Find abc Reference Frame to Stationary Reference Frame (b) Stationary Reference Frame to Synchronous Reference Frame