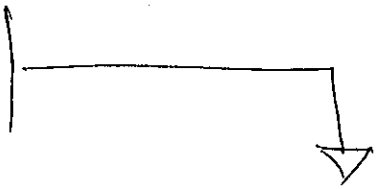
EE523 HW2 XXXX XXXXXX

Consider the load modeling problem.



$$P_{Li} = P^S_{Li} + P^D_{Li} \quad ; \text{ 100 mw}$$

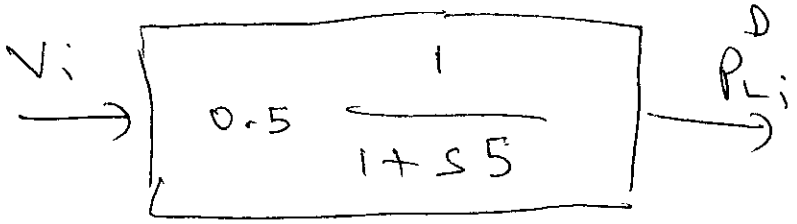
$$Q_{Li} = Q^S_{Li} + Q^D_{Li} \quad ; \text{ 50 mvar}$$

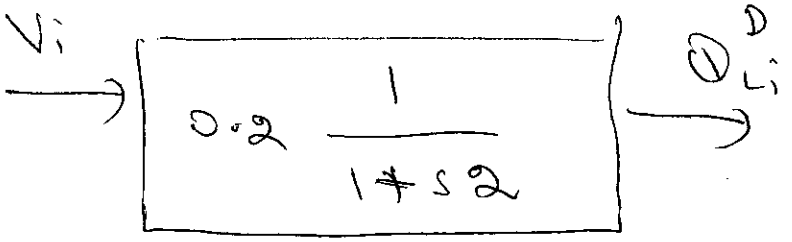
Static Load Model:

$$P^S_{Li} = 0.5\, V_i^{0.7}$$

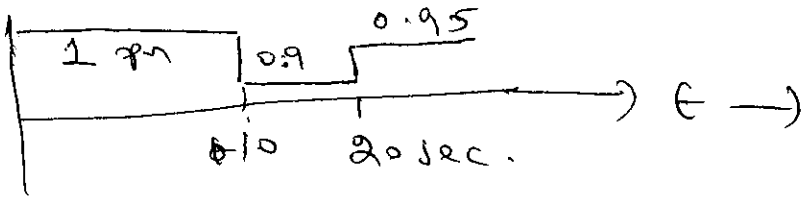
$$Q^S_{Li} = 0.8\, V_i^{0.6}$$

Dynamic Load Model:

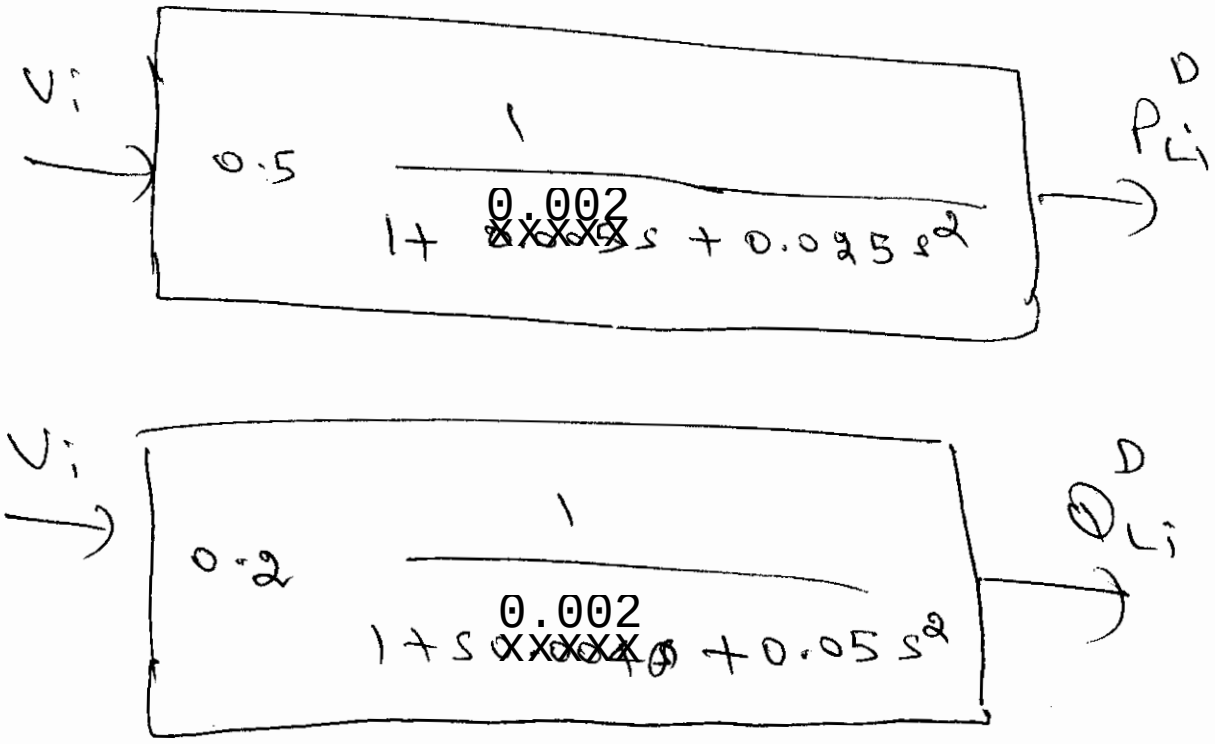




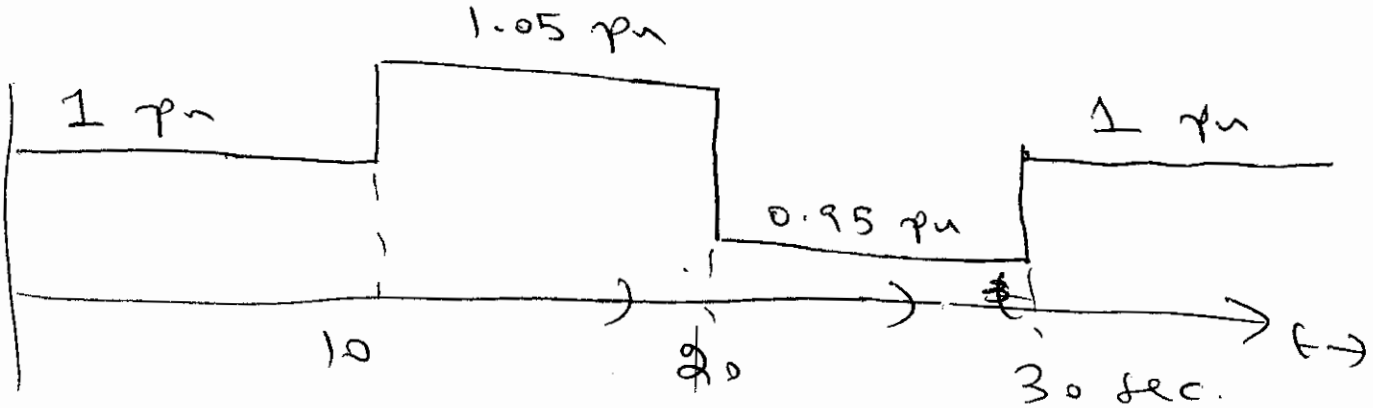
a) Suppose bus voltage changes from 1 to 0.9 pu at time $t=10$ sec. and from ~~1~~ 0.9 pu to 0.95 pu at $t=20$ sec. Find the responses of the loads P_{Li} and Q_{Li}.



b) Repeat for the dynamic load model



c) Repeat parts a) and b) for the voltage variation shown below:



d) Suppose the static load model changes to PLStatic = 0.2 + 0.2 V + 0.1 V*V and QLStatic = 0.1 V + 0.1 V*V. Then repeat parts a) through c) with this model.

2) Estimate the composite load model of a substation using the load response shown below. The static load is assumed to be a ZIP model and the dynamic load is modeled by a first order transfer function.