

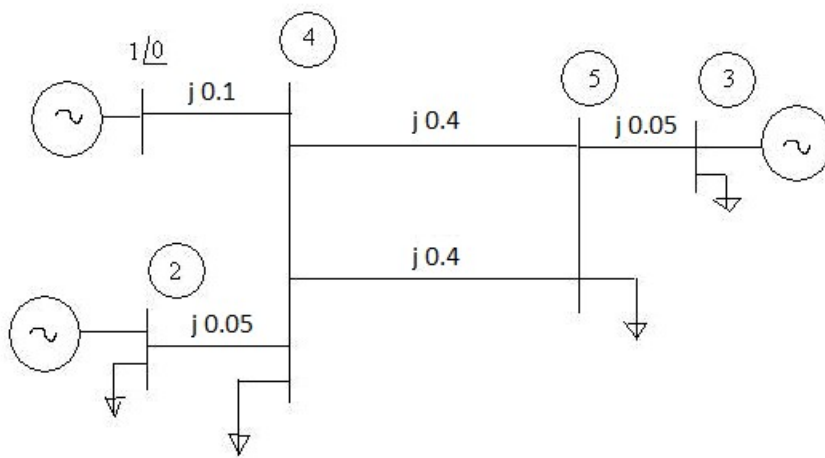
EE 491 Project 1

(Take-Home Examination)

Due on November 6, 2020 at 5 pm

Rules: No discussion of any sort with any other student or friend. And, you cannot reuse Matlab programs from the previous years or from the internet. In case of questions, please contact the instructor. If the rules are not followed in the take home exam, that will lead to a Fail grade in the course.

Consider the following power system.



Suppose the following are specified:

$$PG2 = 0.5, V2 = 1.05, PG3 = 0.9, V3 = 1.06$$

$$PL2 = 0.2, PL3 = 0.3, PL4 = 0.6, PL5 = 0.6$$

$$QL2 = 0.1, QL3 = 0.1, QL4 = 0.2, QL5 = 0.2$$

- Classify the bus types and write out the power-flow equations.
- Compute the DC power-flow solution.
- Starting from the DC power-flow solution, implement the Newton-Algorithm till all the power mismatch errors are smaller than 0.001 pu. How many iterations does it take to reach convergence?
- Starting from the DC power-flow solution, implement the fast decoupled power-flow algorithm until all the power mismatches are smaller than 0.001 pu. How many iterations does it take to reach the convergence?

e) Repeat parts b, c and d, when each of the loads specified, PL2 through PL5, and QL2 through QL5, become double of the values stated above. Comment on your results.

f) Repeat parts b, c and d, when each of the loads specified, PL2 through PL5, and QL2 through QL5, become half of the values stated above. Comment on your results.