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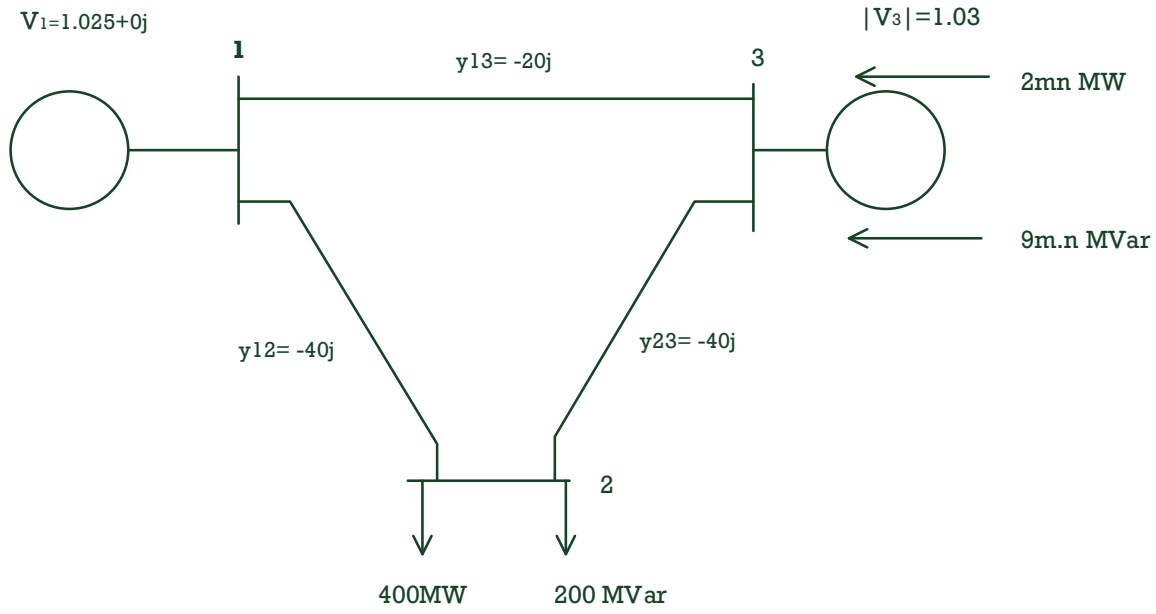
Faculty of Engineering and Architecture
Electrical and Electronics Engineering Department

Name:
Student ID:
Signature:

EEE306-Power Systems | Midterm Project | Due: 22.05.2020

1. The below given Figure shows the one-line diagram of a simple three-bus power system with generation at buses 1 and 3. The voltage at bus 1 is $V_1 = 1.025\angle 0°$ per unit. Voltage magnitude at bus 3 is fixed at 1.03 pu with a real and reactive power generation of 2mn MW, 9m.n MVar, respectively. A load consisting of 400 MW and 200 MVar is taken from bus 2. Line admitances are marked in per unit on a 100 MVA base. For the purpose of hand calculations, line resistances and line charging susceptances are neglected.
Using Gauss-Seidel method and initial estimates of $V_2^{(0)} = 1 + j0$ pu and $V_3^{(0)} = 1.03 + j0$ and keeping $|V_3| = 1.03$ pu, determine the phasor values of V_2 and V_3. Perform three iterations. **(50p)**



2. Solve the same problem using the code you write as an m-file in MATLAB. **(50p)**

Hints:

- mn is the last two digits of your student number. For example if the last two digits of your student number is 97, then m is equal to 9 and n is equal to 7. Therefore, the real power generation at Bus 3 becomes 297 MW and the reactive power generation at Bus 3 becomes 99.7 MVAr.
- Each project depends on a single person, and if the last two digits of the student numbers of two separate students are the same, then their projects will be analyzed in **further details** in order to be sure about any **copy issue!**
- Solving Problem 1 correctly is mandatory! For the students who cannot solve Problem 1 correctly, the solutions of Problem 2 will be neglected in order to be fully sure about the copy of the code in Problem 2.
- You should provide a report for the project. You can use this file as a cover page (fulfilled with a pen that cannot be erased!) or you can also provide a separate cover page including the course name, student name, student ID and a signature.
- For Problem 1, it is mandatory to use the Equations format in Microsoft Word software. No handwriting will be accepted! You can also use LATEX in this manner. You should draw a separate table summarizing the results of each iteration at the end of Problem 1!
- For Problem 2, it is mandatory to give all the code in the report.
- Each student will also deliver a zip file as an attachment to the report including the Word (or LATEX) version of the report, the MATLAB m-file. Any missing attachment will result in loss of project points.
- The projects should be submitted to the UBS system till May 22, 2020, 4pm. The projects delivered later with any reason will be neglected and will therefore be given zero points.

Asst. Prof. İbrahim ŞENGÖR