ELK14: Methods and Algorithms for Power Systems

Assignment 2: Continuation Power Flow
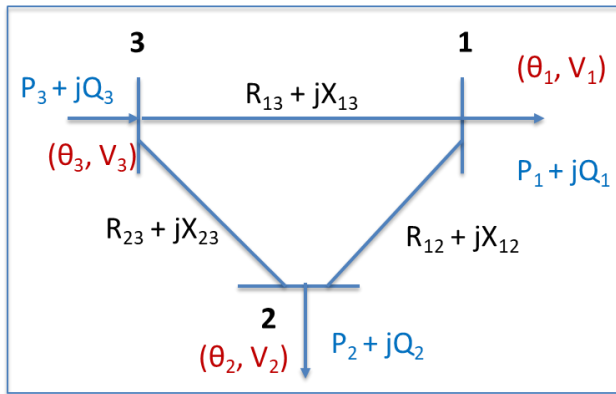

Network	
R_{12}	0.1
X_{12}	0.2
R_{13}	0.05
X_{13}	0.25
R_{23}	0.05
X_{23}	0.15
Loads	
P_1	-0.8
Q_1	-0.5
P_2	-0.4
Q_2	-0.5

Figure 1: Example system – all data in PU.

The bus 3 can be used as slackbus.

The calculations will be done on the example system shown in figure 1.

The lecture should be useful as a model for this assignment.

For each step show:

- The Jacobi matrix with extensions
- Net injections and mismatch vector (right-hand side of equation)
- The correction vector (angle and magnitude)
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1. Calculate the base case conditions as specified in the table assuming a flat start (Angles equals zero and all bus voltages equals one)
2. Find the prediction vector when the load increase is on Bus 1 (30%) and Bus 2 (70%)
3. Take on prediction step of 30% and estimate the voltage angles and magnitudes. Make the needed number of correction steps (load fixed) to get the correct value.
4. Make another predictions step and use 30% load change. Estimate voltage angles and magnitudes.
5. Make correction iterations when the voltage at the bus with largest rate of change is the continuation parameter (kept fixed)

Extra point of Load Flow part to enhance understanding

Derive the Jacobi elements given in the lecture just to convince yourself. This may be useful now for the understanding and possibly on the exam.