ECE 470 POWER SYSTEMS I

Lab # 10 – Fault Level Analysis

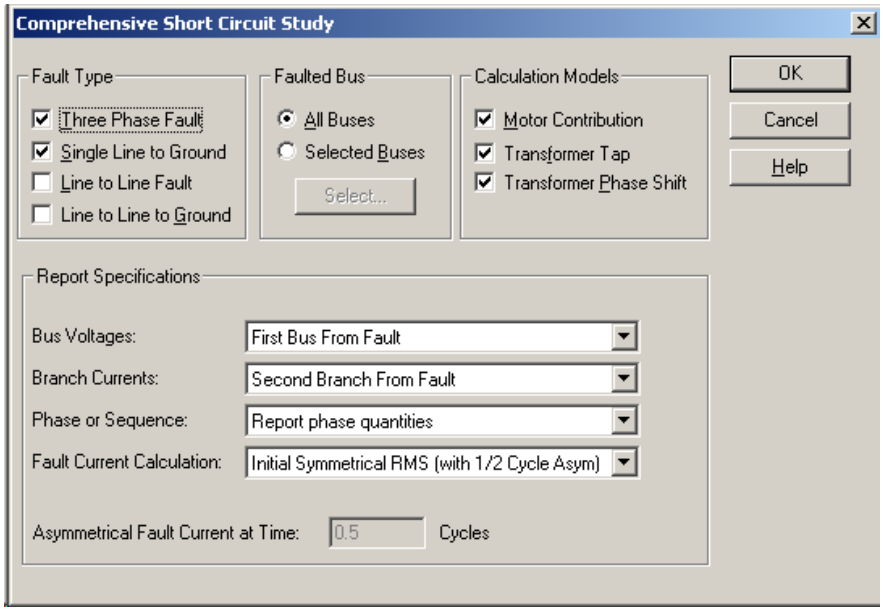
This Lab will require the Fault Level software in the **SKM Power Tools** package in the Power Lab. This is similar to the Load Flow analysis that was performed in Lab 7.

The system you will study is the same as in lab 7, i.e. the load flow study that was taken from chapter 8 of "Elements of Power System Analysis" by W.D. Stevenson. Refer to lab 7 for the load flow data.

Since we want to get the *nominal* fault levels, change the pu voltages at each generator to 1 pu. Also, go to the **ANSI Contribution** tab on the generator data and enter 0.16 pu for positive and negative sequence, with 0.04 pu for zero sequence. Leave the X/R Ratios at 20.

For each transmission line, leave the positive and negative sequence impedances as they were entered in the load flow, but make the zero sequence values double the positive.

You are now ready to run the Fault Study for this system. Click on the one-line diagram then select the **Run>Balanced System Studies** option. Uncheck the **Load Flow** box and check the **SC Comprehensive** box, click on **Setup** and confirm the following options are selected:



Click **OK** and then click **Run**. The **Study Messages** window will appear and when the study is complete, click **Close**. To review the results, select the **Document>Report** option and open **SC.rpt** and the results will be displayed in tabular form. A summary of the results can be displayed on the one-line diagram by selecting **Run>Datablock Format** then selecting **Branch Fault Currents (Comprehensive)** then click the **Apply** and **Close** buttons. The one-line diagram will display a summary of the Fault Level data next to each component.

Use the results from SC.rpt to determine the largest fault currents that will flow in each line. If all fault currents have an asymmetrical factor (K_0) of 1.6 what are the withstand ratings of the circuit breakers?