ECE 476 – Power System Analysis Fall 2017
Homework 10

Reading: Section 8.1 in Chapter 8 of textbook, and Sections 9.1–9.4 in Chapter 9 of textbook.
In-class quiz: Thursday, December 7, 2017

Problem 1. (a) Find the (leading) symmetrical components, $\overline{I}_a^0$, $\overline{I}_a^+$, and $\overline{I}_a^-$, for $\overline{I}_a = 1$, $\overline{I}_b = 10$, and $\overline{I}_c = -10$; (b) Check by sketching $\overline{I}_a$, $\overline{I}_b$, and $\overline{I}_c$, as the sum of appropriate symmetrical components.

Problem 2. Find the symmetrical components of $\overline{E}_a = e^{j0}$, $\overline{E}_b = e^{-j\pi/2}$, $\overline{E}_c = e^{-j3\pi/4}$.

Problem 3. Refer to Fig. 1, and assume that $\overline{E}_a = 1$, $\overline{E}_b = -1$, $\overline{E}_c = j1$. (a) Describe how you would use the method of symmetrical components to find $\overline{I}_a$, $\overline{I}_b$, and $\overline{I}_a$; (b) Carry out the procedure.

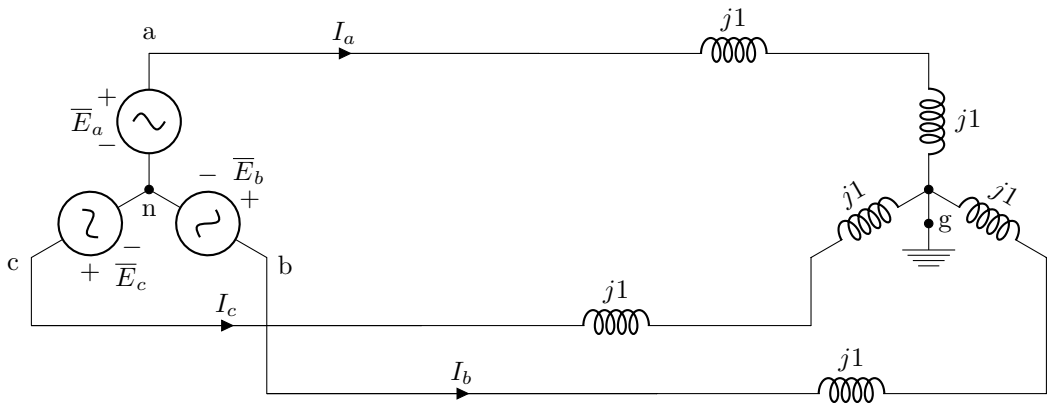

Figure 1: Power system diagram

Problem 4. In Fig. 2, the source voltages are positive-sequence sets and $\overline{Z}^f = \overline{Z}$. Using an appropriate interconnections of sequene networks, find $\overline{I}^f$ (in terms of $\overline{Z}$, and $\overline{V}_{a'g}$).

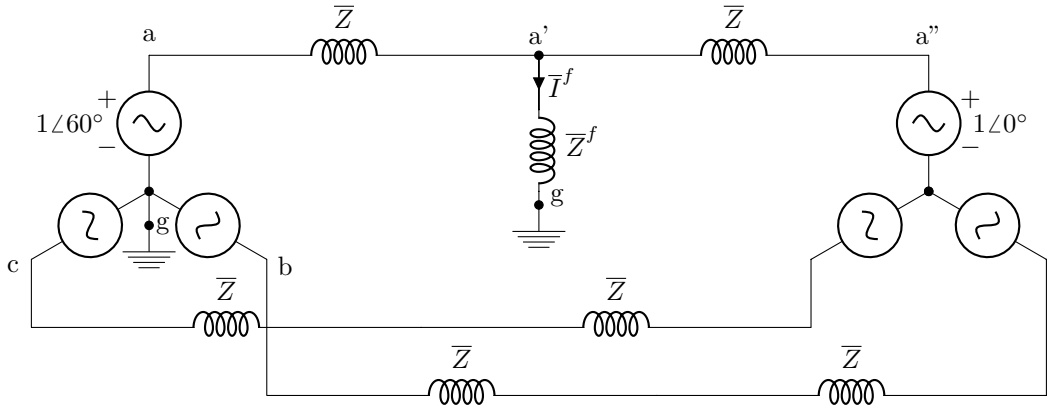

Figure 2: Power system diagram 2