

EE 457, Spring 2015, Dr. McCalley
Homework #1: Due Tuesday, Jan 20

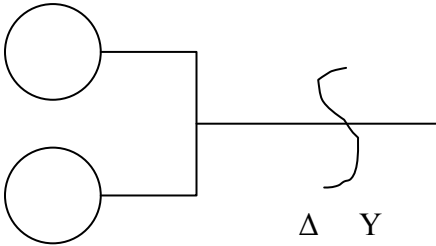
Part A:

1. Using the output from the matlab code provided above, for $\alpha=\pi$, compute the ratio $K(\alpha)=|i|_{\max}(\alpha)/|i_1|_{\max}$, where the “max” indicates the maximum absolute value of the waveform.
2. Repeat for the following values of α :
 $\alpha=3, 2.5, 2, 1.5, 1, 0.5, 0$.
3. Repeat parts (1) and (2) but use $R=0.1$.
4. Repeat parts (1) and (2) but use $R=10$.

Part B:

Two generators are connected in parallel to the low-voltage side of a three-phase Δ -Y transformer, as shown in the figure below. Generator 1 is rated 50,000 kVA, 13.8kV. Generator 2 is rated 25,000kVA, 13.8kV. Each generator has a subtransient reactance of 25% on its own base. The transformer is rated 75,000kVA, 13.8 Δ /69Y kV, with a reactance of 10% on its own base. Before the fault occurs,

the voltage on the high-voltage side of the transformer is 66kV. The transformer is unloaded and there is no circulating current between the generators. Find the subtransient current in each generator when a three-phase short circuit occurs on the high-voltage side of the transformer.



Hint: The circuit to analyze should appear as below.

