

ECE 526 Project 3: Due at beginning of lecture, May 6<sup>th</sup>, 2005 (Lecture 42)

Off campus students should send an email to me at [rwall@uidaho.edu](mailto:rwall@uidaho.edu) to request the file containing the dataset. You have 9 days from the time that you request the dataset to submit your report and program.

Given the data set provided, determine the type, time and location and resistance (secondary ohms) of the in zone fault on the system shown in Figure 1.

System information is as follows:

$$Z_{ss} = \begin{pmatrix} 7.674 + 18.159i & 4.014 + 9.233i & 3.826 + 8.684i \\ 4.014 + 9.233i & 7.826 + 18.066i & 3.901 + 9.253i \\ 3.826 + 8.684i & 4.014 + 9.233i & 7.674 + 18.159i \end{pmatrix}$$

$$Z_{rr} = \begin{pmatrix} 1 + 19.689i & 0.614 + 10.049i & 0.625 + 9.469i \\ 0.614 + 10.049i & 1.175 + 19.653i & 0.501 + 10.029i \\ 0.625 + 9.469i & 0.614 + 10.049i & 1 + 19.689i \end{pmatrix}$$

$$Z_{tt} = \begin{pmatrix} 1 + 19.689i & 0.614 + 10.049i & 0.625 + 9.469i \\ 0.614 + 10.049i & 1.175 + 19.653i & 0.501 + 10.029i \\ 0.625 + 9.469i & 0.614 + 10.049i & 1 + 19.689i \end{pmatrix}$$

Per mile line impedance

$$Z_L := \begin{pmatrix} 0.327791 + 1i \cdot 1.40591 & 0.092787 + 1i \cdot 0.649547 & 0.0927762 + 1i \cdot 0.565442 \\ 0.092787 + 1i \cdot 0.649547 & 0.32791 + 1i \cdot 1.40591 & 0.092787 + 1i \cdot 0.649547 \\ 0.0927762 + 1i \cdot 0.565442 & 0.092787 + 1i \cdot 0.649547 & 0.327791 + 1i \cdot 1.40591 \end{pmatrix}$$

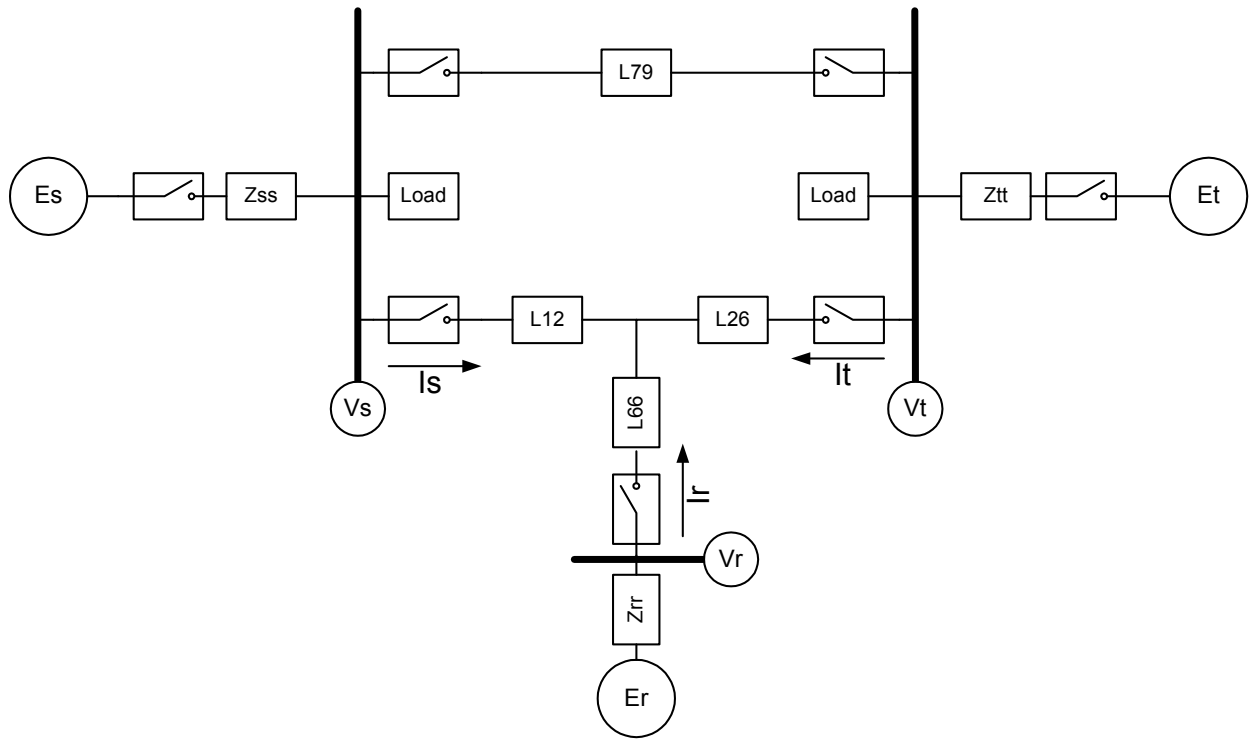
Line lengths: L79 = 100 mi, L12 = 40 mi, L26 = 60 mi, L66 = 20 mi

Data sequence: Time, Vra, Ira, Vrb, Irb, Vrc, Irc, Vsa, Isa, Vsb, Isb, Vsc, Isc, Vta, Ita, Vtb, Itb, Vtc, Itc

PTR = 120/230000, CTR = 5/3000

Maximum Line current: 590A rms

Provide a table of results and a discussion of the methodology used to determine the results including algorithms. Describe time periods of confusing or conflicting results and suggest possible circumstances that would generate the uncertainty. Email to the instructor a source file for your MathCAD solution.



**Figure 1. Project 3 System Diagram**