Illustration of HW #2

Zone 1
Relay A: \( X_{A-21} = 65\% \), \( |Z_{21}| = 65\% \), \( 4 \angle 32^\circ = 2.6 \Omega \)
\( R_{A-21} = 8 X_{A-21} = 20.8 \Omega \)
Relay B: \( X_{B-21} = 2.6 \Omega \), \( R_{B-21} = 20.8 \Omega \)

Zone 2
Relay A: \( X_{A-22} = 1.4 \), \( |Z_{22}| = 1.4 \times 4 = 5.6 \Omega \)
\( R_{A-22} = 2 X_{A-22} = 11.2 \Omega \)
Relay B: \( X_{B-22} = 5.6 \Omega \), \( R_{B-22} = 11.2 \Omega \)
B. \[ T = \frac{I_{OF}}{I_{ORELAY}} \]

\( I_{OF} \): zero sequence of total fault current

\( I_{ORELAY} \): For Relay A
  use \( I_{OL} \)
  For Relay B, use \( I_{OR} \)

\[ 0 \leq m \leq 1 \]
\[ k_0 = \frac{Z_{L0} - Z_{L1}}{3 Z_{L1}} \]
\[ I = I_A + k_0 \cdot 3 I_0 \]

\[ V_{ph} \] — phase A voltage of the Relay
\[ I_{pol} = 3 \cdot I_0 \]

\[ m = 0, 20\%, 40\%, 60\%, 80\%, 100\% \]
2.

For Relay A: \( Z_{2, \text{relay}A} = (1.1 \sim 1.2) |Z_{21}| \)
Relay B: \( Z_{2, \text{relay}B} = (1.1 \sim 1.2) |Z_{21}| \)

Zone 3
For Relay A: (If \( Z_{2, \text{relay}B} = 1.2 |Z_{21}| \), \( Z_{3, \text{relay}A} = 0.3 |Z_{21}| \))
For Relay B: (If \( Z_{2, \text{relay}A} = 1.1 |Z_{21}| \), \( Z_{3, \text{relay}B} = -0.2 |Z_{21}| \))