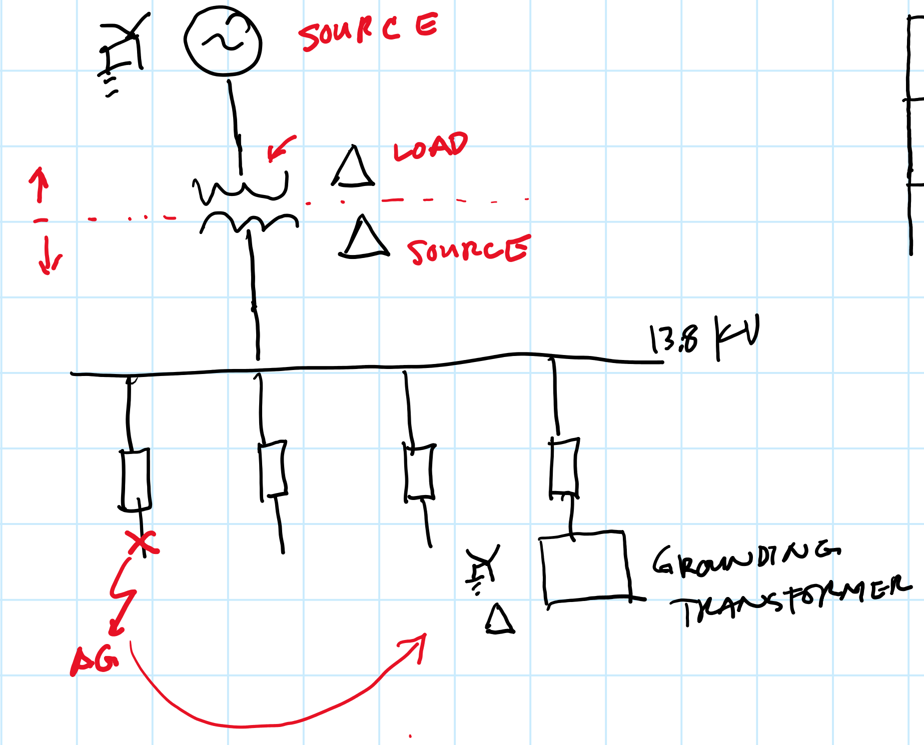
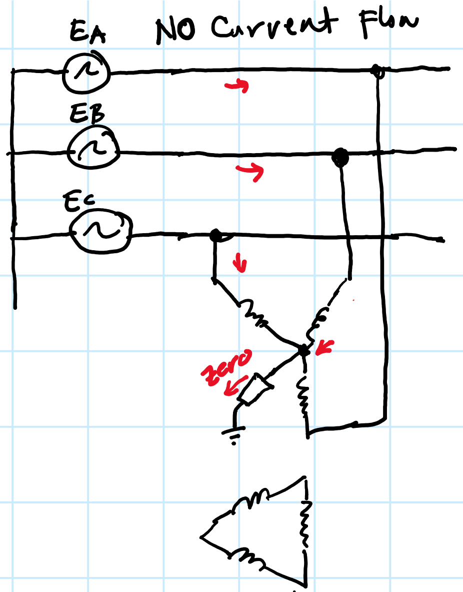
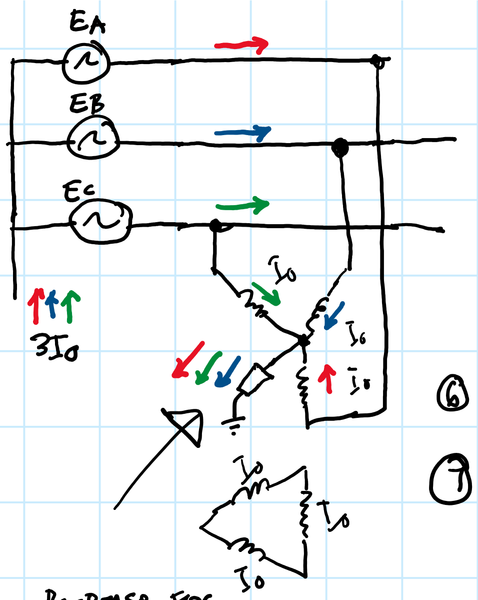




Response for Positive and Negative Sequence Voltage Source



Response for

$I_{FAULT} = 3I_0 = I_A = 3E/(Z_{S(1)} + Z_{T(1)} + Z_{S(2)} + Z_{T(2)} + Z_{T(0)} + 3Z_E)$

$I_{FAULT} \approx 3E/(3Z_E)$

⑥ $I_{base} = 10{,}000{,}000/(\sqrt{3} \times 13{,}800) = 418.37\ A$

⑦ $I_0 = E/[Z_{S(1)} + Z_{S(2)} + Z_{T(0)}]$

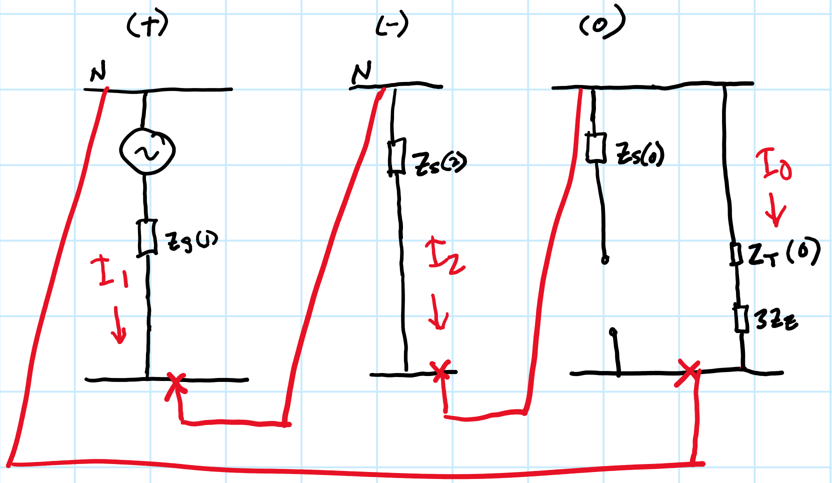
$I_0 = 1.0\angle 0° / [j0.052 + j0.052 + j1.33] = 0.697\ pu$

$I_{FAULT} = 3I_0 = 3 \times 0.697 = 2.091\ pu$

$I_{FAULT} = I_{FAULT\text{-}pu} \times I_{base} = 2.091 \times 418.37 = 874.81\ A$

⑧ Current @ the delta winding: $I_\Delta = I_0 \times 418.37 \times 8000/120$

$I_\Delta = 19{,}440.26\ A$



Given Data:

① Three-Phase Fault @ 13.8kV bus is 8KA

② Grounding transformer is a bank of 3 x 50kVA, 8000/120 V @ 2%Z

Calculate for Fault Current:

① Choose 10 MVA base

② $Z_{base} = 13.8^2/10 = 19.044\ \Omega$

③ $Z_{S(1)} = Z_{S(2)} = j[13800/(\sqrt{3} \times 8000)] = j0.996\ \Omega$

④ $Z_{S(1)pu} = Z_{S(2)pu} = j0.996/19.044 = 0.052\ pu$

⑨ Given that $Z_E = 20\Omega$. Calculate for I_{FAULT}

$I_0 = E/[Z_{S(1)} + Z_{S(2)} + Z_{T(0)} + 3Z_E]$

$I_0 = 1.0\angle 0° / [j0.052 + j0.052 + j1.33 + 3 \times 20/19.044]$

$I_0 = 0.2889 \angle -24.47°$

$I_{FAULT} = 3 \times 0.2889 = 0.8667\ pu$

$I_{FAULT} = 0.8667 \times 418.37 = 362.6\ A$

$I_\Delta = 0.2889 \times 418.37 \times 8000/120 = 8057.81\ A$

④ $Z_{S(1)pu} = Z_{S(2)pu} = j0.996 / 19.044 = 0.052$ pu

⑤ $Z_T = j0.02 \times \frac{10,000}{3 \times 50} = 1.33$ pu