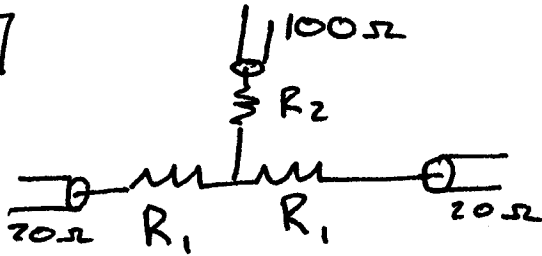


Homework # 2

3.7



$$R_1 + (R_2 + 100) // (R_1 + 20) = 20$$

$$R_2 + \frac{R_1 + 20}{2} = 100$$

$$R_2 = 100 - \frac{R_1 + 20}{2} = 90 - \frac{R_1}{2}$$

$$R_1 + \left(90 - \frac{R_1}{2}\right) // (R_1 + 20) = 20$$

$$R_1 + \left(190 - \frac{R_1}{2}\right) // (R_1 + 20) = 20$$

numeric solution:

$$R_1 \approx \frac{20}{19} \approx 1.05 \Omega \Rightarrow R_2 = 90 - \frac{20}{38} \approx 89.5 \Omega$$

hand approximation:

$$R_1 \text{ small, } R_2 \approx 90 \Omega$$

$$R_1 \approx 20 - \frac{1}{1/190 + 1/20} = 1.9$$

Plug back in:

$$R_1 \approx 20 - \frac{1}{1/189 + 1/20.9} = .37$$

$$\approx 20 - \frac{1}{1/190 + 1/20.4} = 1.6$$

$$\approx 20 - \frac{1}{1/189 + 1/20.6} = .61$$

$$\approx 20 - \frac{1}{1/190 + 1/20.6} = 1.4$$

$$\text{IE: } R_2 \approx 89.5 \quad R_1 \approx 1$$