

EE 3 F'13 Quiz 1 Solution

First determine the equivalent resistances of series and parallel combinations

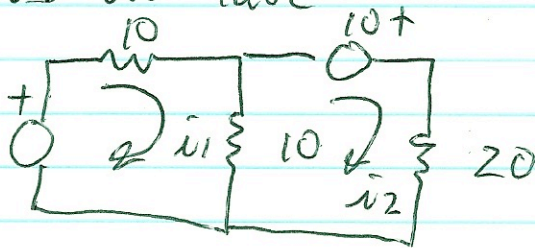
R_6 & R_7 are in series; $R_{eq1} = 20 \Omega$

R_{eq1} & R_5 are in parallel; $R_{eq2} = 10 \Omega$

R_3 & R_4 are in parallel; $R_{eq3} = 10 \Omega$

R_{eq2} & R_{eq3} are in series; $R_{eq4} = 20 \Omega$

Thus we have



Mesh Equations:

$$10 = 10 i_1 + 10 (i_1 - i_2) = 20 i_1 - 10 i_2 \quad (1)$$

$$10 = 20 i_2 + 10 (i_2 - i_1) = -10 i_1 + 30 i_2 \quad (2)$$

add $\frac{1}{2}$ (1) to (2): $15 = 25 i_2$; $i_2 = 3/5$ A

subst in (1): $10 = 20 i_1 - 6$; $i_1 = 4/5$ A

The currents through the parallel resistors divide equally and so $i_3 = i_4 = 0.3$ A