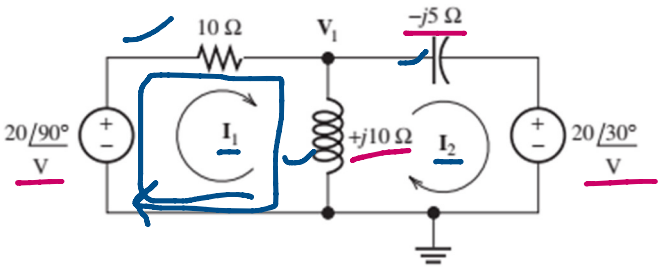
Example 1

Sunday, 16 August, 2020 10:19 AM

- Find Mesh Currents I1 and I2



Step 1: Convert the circuits elements using complex impedances

Step 2: Represent the voltage or current sources in Phasor Form

Step 3: Mesh-Current Analysis

Loop 1:

$10(I1) + 10j\,(I1-I2) - 20\angle 90 = 0$

Loop 2:

$10j(I2-I1) - 5j\,(I2) + 20\angle 30 = 0$

$I1\,(10+10j) + I2\,(-10j) = 20\angle 90$
$I1\,(-10j) + I2\,(5j) = -20\angle 30$

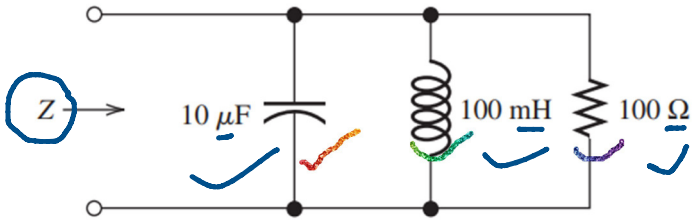
I1 =

I2 =

Example 2

Monday, 17 August, 2020 10:39 AM

- **Compute the complex impedance of the network shown in Figure for ω = 500.**
- **Repeat for ω = 1000 and ω = 2000. Give the answers in both phasor and complex forms**



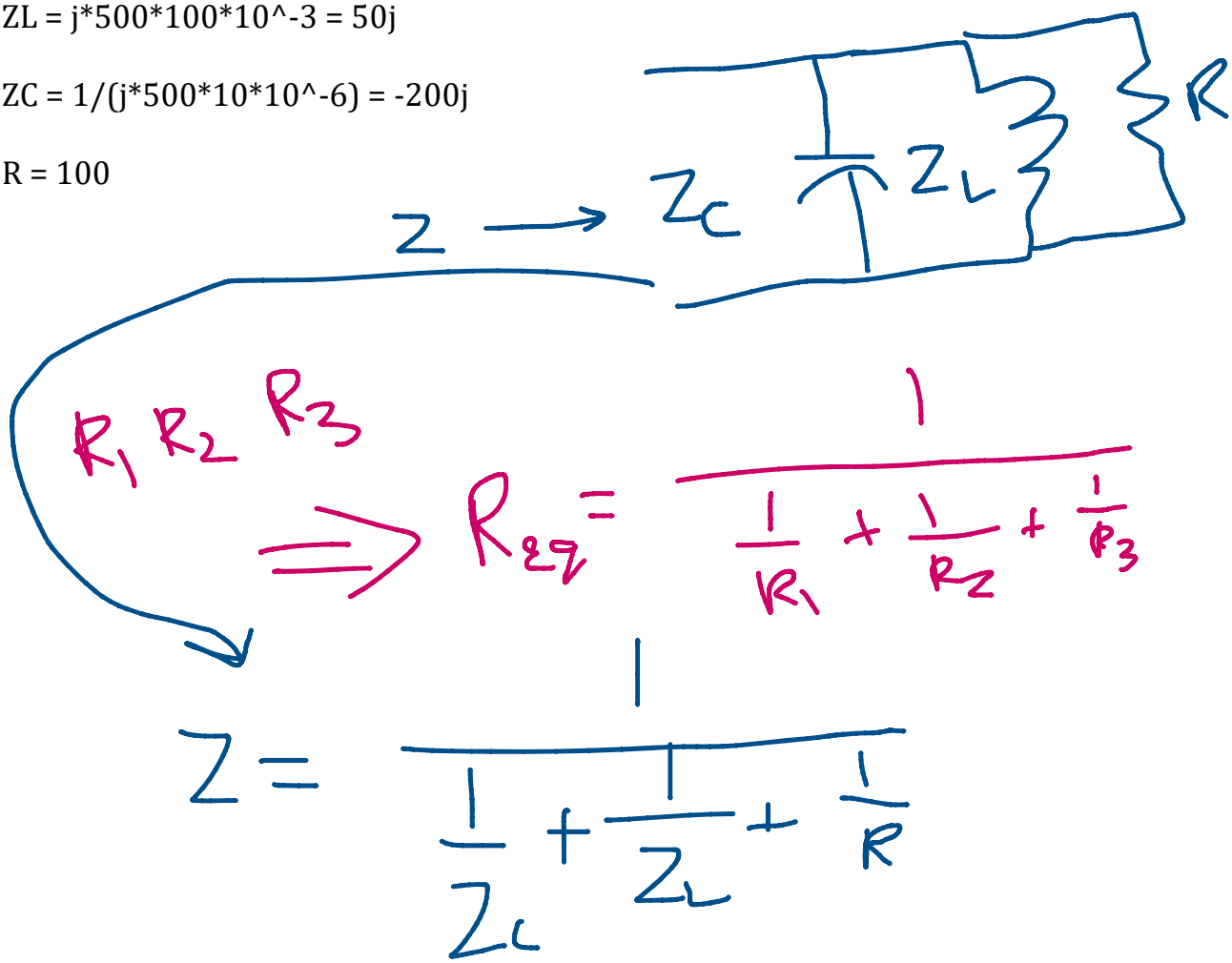
Step 1: Convert the circuit elements into Complex Impedances

ZL = j*500*100*10^-3 = 50j

ZC = 1/(j*500*10*10^-6) = -200j

R = 100

Parallel

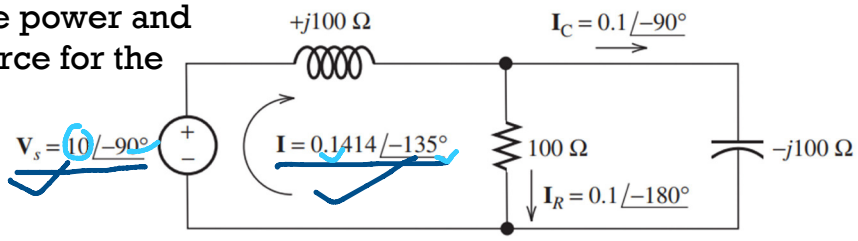


Z= 1/(1/100 + 1/50j + 1/(-200j)) =

Example 3 - AC Power Calculations

Monday, 17 August, 2020 11:54 AM

- **Compute the active power, reactive power and apparent power taken from the source for the circuit**



Vrms = Vm/root(2) = 10/root(2) = 7.07

Irms = Im/root(2) = 0.1414/root(2) = 0.1

Theta = thetaV -thetaI = -90-(-135) = 45

P = 7.07*0.1*cos(45) = 0.5

Q = 7.07*0.1*sin(45) = 0.5

A = 0.5^2 + 0.5^2 = 0.5

Active Power (P) = Vrms Irms cos(theta)
Reactive Power (Q) = Vrms Irms sin(theta)
Apparent Power (A) = (Vrms Irms)^2