

Using the Spreadsheet Complex Matrix by Decomposition

In the screen shot below we are using the spreadsheet to solve the three complex simultaneous equation:

$$\mathbf{Z}_{1A}\mathbf{I}_1 + \mathbf{Z}_{1B}\mathbf{I}_2 + \mathbf{Z}_{1C}\mathbf{I}_3 = \mathbf{V}_1$$

$$\mathbf{Z}_{2A}\mathbf{I}_1 + \mathbf{Z}_{2B}\mathbf{I}_2 + \mathbf{Z}_{2C}\mathbf{I}_3 = \mathbf{V}_2$$

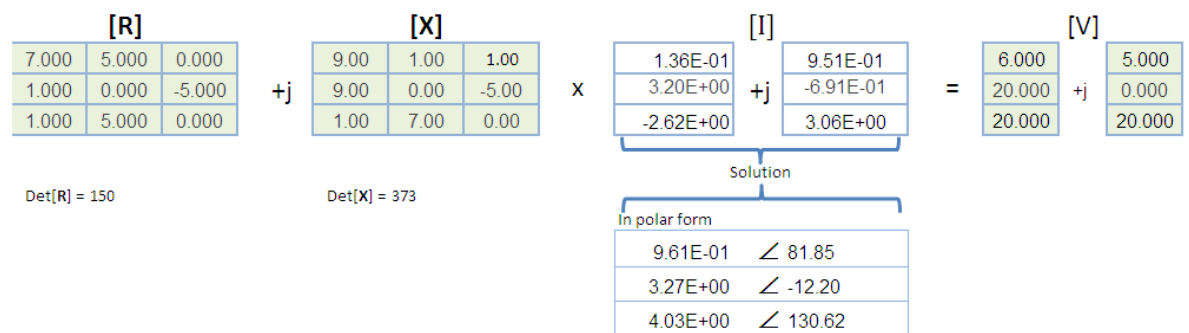
$$\mathbf{Z}_{3A}\mathbf{I}_1 + \mathbf{Z}_{3B}\mathbf{I}_2 + \mathbf{Z}_{3C}\mathbf{I}_3 = \mathbf{V}_3$$

where $\mathbf{V}_1 = 6 + j5$ volts, $\mathbf{V}_2 = 20 + j0$ volts and $\mathbf{V}_3 = 20 + j20$ volts

$$\mathbf{Z}_{1A} = 7 + j9 \, \Omega, \mathbf{Z}_{1B} = 5 + j1 \, \Omega, \mathbf{Z}_{1C} = 0 + j1 \, \Omega,$$

$$\mathbf{Z}_{2A} = 1 + j9 \, \Omega, \mathbf{Z}_{2B} = 0 + j0 \, \Omega, \mathbf{Z}_{2C} = -5 + j-5 \, \Omega,$$

$$\mathbf{Z}_{3A} = 1 + j1 \, \Omega, \mathbf{Z}_{3B} = 5 + j7 \, \Omega, \mathbf{Z}_{3C} = 0 + j0 \, \Omega$$



The solution is:

$$\mathbf{I}_1 = 0.136 + j0.951 \text{ A}$$

$$\mathbf{I}_2 = 3.2 - j0.691 \text{ A}$$

$$\mathbf{I}_3 = -2.62 + j3.06 \text{ A.}$$

