ECE 111 - Homework #12

Complex Numbers - Due Monday, April 8th

Complex Numbers

1) Determine the rectangular or polar form of each complex number

- $3 - j6$
- $-7 - j2$
- $8\angle 147^0$
- $12\angle -85^0$

2) Determine y as a complex number

- $y = (6 + j8) + (-7 + j8) + (3 - j7)$
- $y = (4\angle 84^0) + (7\angle -62^0) + (9\angle 85^0)$

3) Determine y as a complex number

- $y = \left(\frac{(6+j8)(-7+j8)}{(3-j7)}\right)$
- $y = \left(\left(\frac{6+j8}{-7+j8}\right) + \left(\frac{9+j6}{-j7}\right)\right)\left(\frac{-2+j6}{8+j9}\right)$

4) Determine y as a complex number

- $y = e^{(3+j7)}$
- $y = \ln(-9 + j9)$
- $y = (4 + j5)^{(5-j2)}$

Partial Fractions with Complex Numbers

5) Determine the partial fraction expansion

$$\left(\frac{3(x-7)(x+4)}{(x+9+j4)(x+9-j4)(x+9)}\right) = \left(\frac{a}{x+9+j4}\right) + \left(\frac{b}{x+9-j4}\right) + \left(\frac{c}{x+9}\right)$$

6) Determine the partial fraction expansion

$$\left(\frac{8(x+j6)(x-j6)}{x(x+4)(x+9+j)(x+9-j)}\right) = \left(\frac{a}{x+0}\right) + \left(\frac{b}{x+4}\right) + \left(\frac{c}{x+9+j}\right) + \left(\frac{d}{x+9-j}\right)$$