ECE 111 - Homework #12

Complex Numbers

Complex Numbers

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

- $6 - j4$
- $1 + j4$
- $8\angle 17^0$
- $10\angle -130^0$

2) Determine y as a complex number

- $y = (9 - j4) + (-3 + j3) + (-6 - 4j)$
- $y = (6\angle 12^0) + (6\angle 101^0) + (2\angle 157^0)$

3) Determine y as a complex number

- $y = \left(\frac{(6-j6)(-3+j3)}{(1+j4)}\right)$
- $y = \left(\left(\frac{9+j}{-7-j8}\right) + \left(\frac{10-j2}{-9-j4}\right)\right)\left(\frac{6+j7}{7-j}\right)$

4) Determine y as a complex number

- $y = e^{(9-j6)}$
- $y = \ln(9 - j6)$
- $y = (9 + j6)^{(-4-j7)}$

Partial Fractions with Complex Numbers

5) Determine the partial fraction expansion

$$\left(\frac{5(x-7)(x+8)}{(x+2+j2)(x+2-j2)(x+1)}\right) = \left(\frac{a}{x+2+j2}\right) + \left(\frac{b}{x+2-j2}\right) + \left(\frac{c}{x+1}\right)$$

6) Determine the partial fraction expansion

$$\left(\frac{5(x+8+j5)(x+8-j5)}{(x+6)(x+7)(x+5+j2)(x+5-j2)}\right) = \left(\frac{a}{x+6}\right) + \left(\frac{b}{x+7}\right) + \left(\frac{c}{x+5+j2}\right) + \left(\frac{d}{x+5-j2}\right)$$