
Set #1

Due Friday January 28, 2011

Make note of the following:

- We will begin discussion of these problems in class on Friday January 21
- Write only on one side of the paper
- Please try if possible to start each new problem on a clean sheet of paper
- Use engineering paper if you like

Problems:

1. Convert the following complex numbers to polar form:

- a.) $z = -2 + j3$
- b.) $z = (4, 7)$
- c.) $z = 100 - j5$
- d.) $z = (0, -20)$

2. Convert the following number to rectangular form:

- a.) $z = 25e^{j\pi/3}$
- b.) $z = 13 \angle \pi$
- c.) $z = 70e^{-j5.12}$
- d.) $z = \sqrt{6}e^{j6\pi}$

3. Evaluate the following for $z_1 = 3 + j2$ and $z_2 = 7 - j2$.

- a.) $z_3 = z_1 + z_2$
- b.) $z_3 = z_2 / z_1$
- c.) $z_3 = z_1 z_2$
- d.) $z_3 = (1/z_1) + z_2^*$

4. Define $x(t)$ as

$$x(t) = 7 \cos(\omega_0 t - \pi/8)$$

- a.) For $\omega_0 = \pi/7$, make a plot of $x(t)$ that is valid over the range $-5 \leq t \leq 15$ s. You may use MATLAB for this plot if you wish. Otherwise plotting by hand is also acceptable.
- b.) Plot $y(t) = x(t - 3.4)$. What is the modulo 2π phase shift, ϕ , of $y(t)$ relative to $x(t)$? Give your answer in both radians and degrees.