ECE 343 - Homework #1

Complex Numbers and Phasors - Summer 2018

Complex Numbers

Solve for Y

1) $Y = \left(\dfrac{10(s+3)}{s(s+2)(s+10)} \right)_{s=j5}$

2) $Y = \left(\dfrac{20}{s^3+4s^2+6s+10} \right)_{s=-1+j3}$

3) $Y = e^{-2+j3}$

4) $Y = (1+j2) + \left(\dfrac{1}{3+j4} + \dfrac{1}{5+j6} \right)^{-1}$

5) $\begin{bmatrix} 1 & 1+j & 0 \\ 1+j & 2 & j5 \\ 0 & j5 & 3-j \end{bmatrix} Y = \begin{bmatrix} 1 \\ j2 \\ 1-j2 \end{bmatrix}$

Phasors

Determine the phasor representation for y(t)

6) $y(t) = 3\cos(5t) + 6\sin(5t)$

7) $y(t) = -3\cos(6t - 20^0) + 7\sin(6t + 50^0)$

Determine y(t) using phasor analysis

8) $\dfrac{d^2y}{dt^2} + 3\dfrac{dy}{dt} + 20y = 5\dfrac{dx}{dt} + 10x$

$x(t) = 3\cos(4t)$

9) $\dfrac{d^3y}{dt^3} + 6\dfrac{d^2y}{dt^2} + 11\dfrac{dy}{dt} + 24y = 48x$

$x(t) = 4\cos(3t) + 2\sin(3t)$