ECE 111: Handout #17

ECE 343: Signals & Systems, Fourier Transforms

Find y(t)

$$Y = \left(\frac{20}{s+10}\right) X$$

$$x(t) = 2 + 3\cos(4t) + 5\sin(6t)$$

hint: use superposition and treat this as three separate problems

$$x_1(t) = 2 \qquad\qquad x_2(t) = 3\cos(4t) \qquad\qquad x_3(t) = 5\sin(6t)$$

Find y(t)

$$Y = \left(\frac{20}{s+10}\right) X$$

$$x(t) = 2 + 3\cos(4t) + 5\sin(6t)$$

hint: use superposition and treat this as three separate problems

s = 0:

$$x(t) = 2$$

$$Y = \left(\frac{20}{s+10}\right)_{s=0} (2 + j0)$$

$$Y = (2)(2) = 4$$

$$y(t) = 4$$

s = j4

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

$$X = 3 + j0$$

$$Y = \left(\frac{20}{s+10}\right)_{s=j4} (3 + j0)$$

$$Y = 7.759 - j2.103$$

$$y(t) = 7.759\cos(4t) + 2.103\sin(4t)$$

s = j6

$$x(t) = 5\sin(6t)$$

$$X = 0 - j5$$

$$Y = \left(\frac{20}{s+10}\right)_{s=j6} (0 - j5)$$

$$Y = -4.412 - j7.353$$

$$y(t) = -4.412\cos(6t) + 7.353\sin(6t)$$

The total answer is then

$$y(t) = 4 + 7.759\cos(4t) + 2.103\sin(4t) - 4.412\cos(6t) + 7.353\sin(6t)$$