EE-3032, HW-0

Dr. Durant (based on work by Dr. Wierer), Fall 2017

This assignment is a prerequisite assessment due at the ***beginning of the Thursday class*** in week 1. Late work will not be accepted on this assignment.

Please work individually on this assignment. Do all work by hand (check with calculator or MATLAB). Each problem will be assessed on a two-point scale. Satisfactory completion of this assignment will be worth full credit, regardless of the assessment score.

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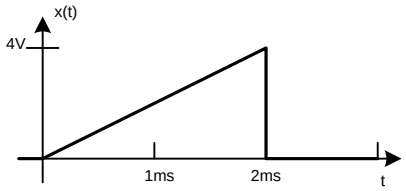
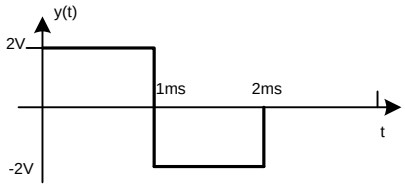
1. The functions $x(t)$ and $y(t)$ are plotted below. Plot $x^2(t)$, $y^2(t)$, and the product function $y(t)x(t)$ over the interval $0 \leq t \leq 2ms$. Clearly label all axes and units on the axis.





2. Write a simplified expression for $x(t) = \mathrm{Im}\{e^{-j(2\pi t - \pi/2)}\}$ and evaluate it for $t = 0, 0.25, 0.5, 0.75, 1$.

3. Write an expression for the complex conjugate of the function $f(t) = x(t)y(t)$, where $x(t) = e^{-j2000\pi t}$ and $y(t) = \frac{1}{2} + \frac{\sqrt{3}}{2}jt$.

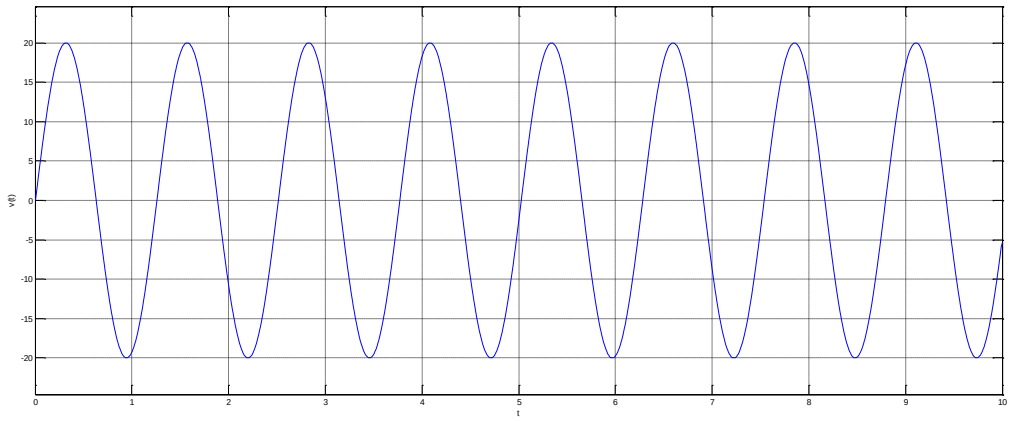
4. Plot the function defined by $x(t) = \int_{-\infty}^{t} 2u(\tau)d\tau$, where $u(t)$ is the unit step function. Set the plotting limits for t in the interval [-1,1].

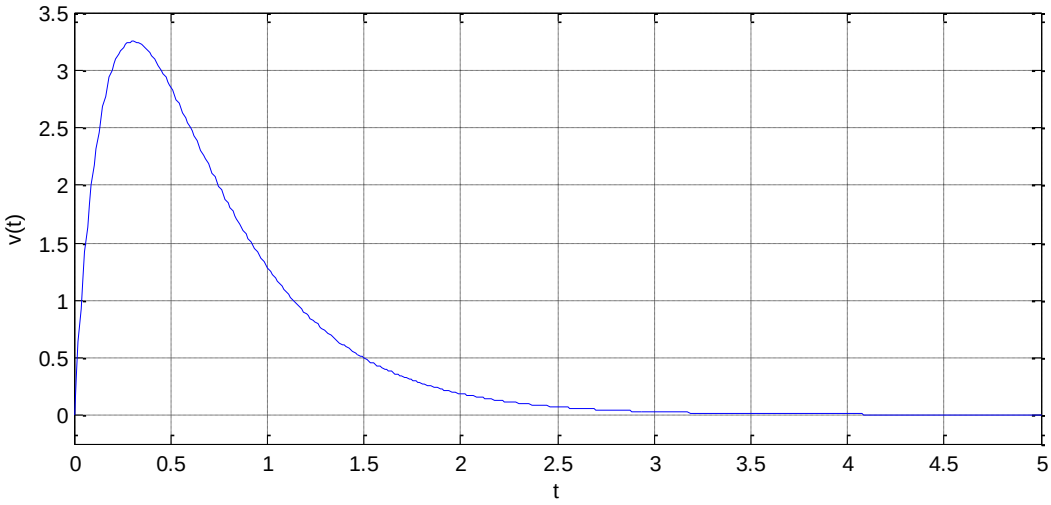
5. Write a simplified expression for $x(t) = \int_{-\infty}^{t} e^{-a\tau}u(\tau)d\tau$, where $u(t)$ is the unit step function.

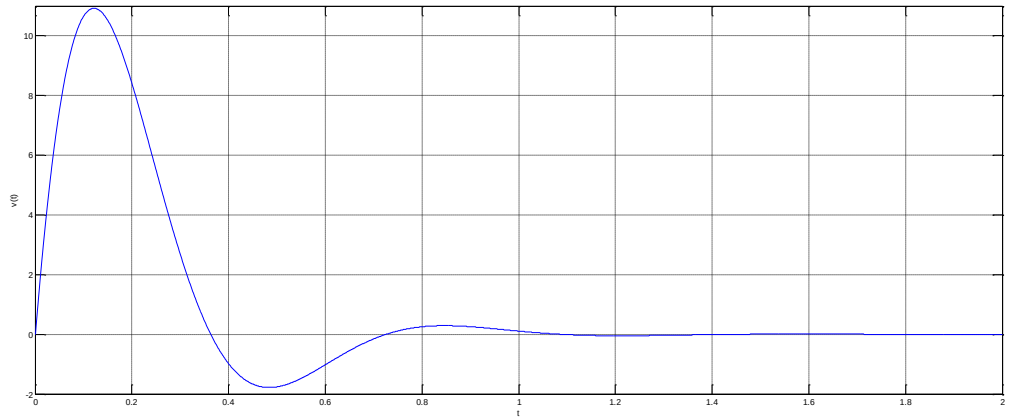
6. Plot the function defined by $x(t) = \int_{-\infty}^{t+1} u(\tau)d\tau$, where $u(t)$ is the unit step function, over the range [-1,1].

7. Match $V_1(s)$, $V_2(s)$, and $V_3(s)$ to the appropriate graphs of $v(t)$ on the following page.

$$V_1(s) = \frac{30}{s^2 + 7s + 10}; V_2(s) = \frac{200}{s^2 + 10s + 100}; V_3(s) = \frac{100}{s^2 + 25}$$


v(t)
t


v(t)
t


v(t)
t