Department of Electrical and Computer Engineering
The University of Alabama in Huntsville

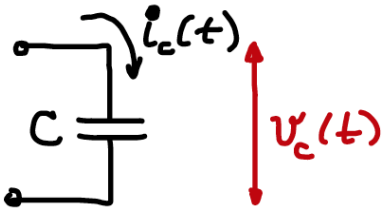
CPE 381: Fundamentals of Signals and Systems for Computer Engineers

Quiz #2 solution

1. The system S has impulse response $h(t)$. If the input of the system is $x(t)$, how can you represent output of the system $y(t)$?

$$y(t) = \int_0^t x(\tau)h(t-\tau)d\tau$$

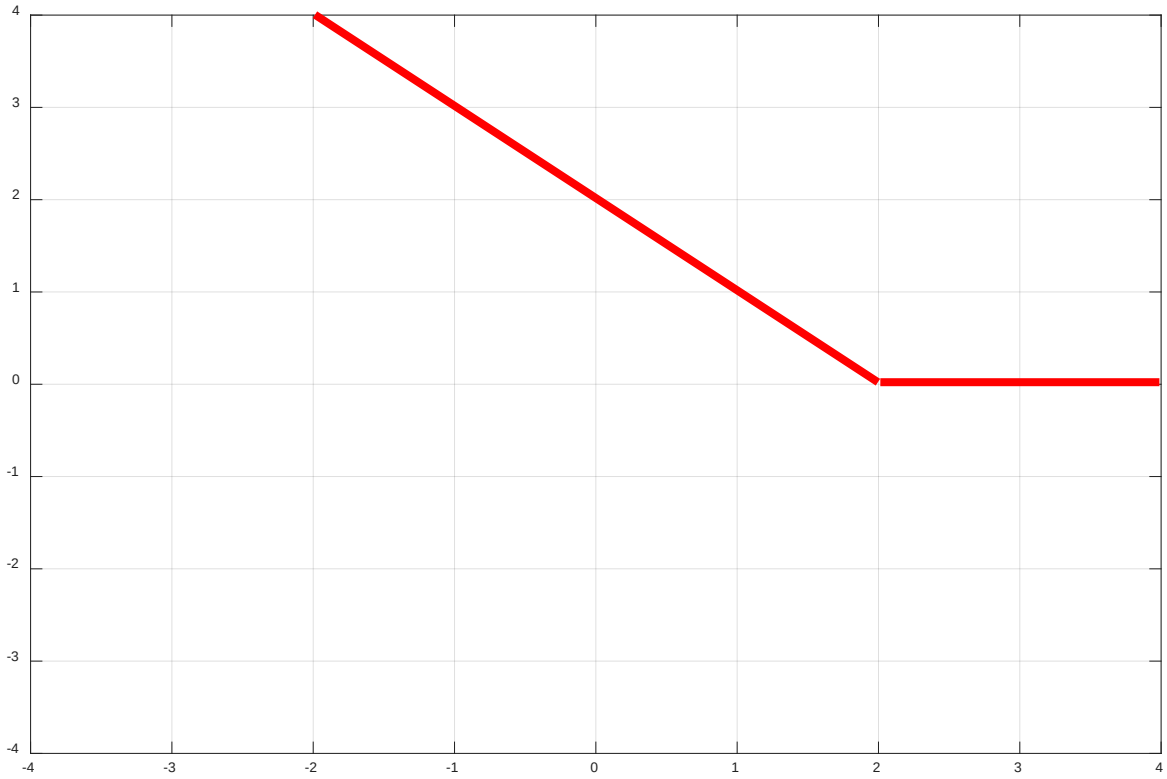
2.



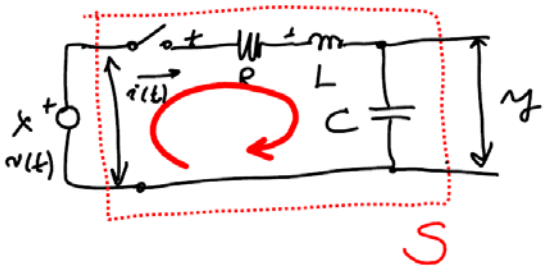
$$v_c(t) = \frac{1}{C}\int_0^t i_c(t)dt + v_c(0)$$

$$h(t) = \frac{1}{C}\int_0^t \delta(\tau)d\tau = \frac{1}{C}$$

3. For the function *r(t)* (ramp function) plot *r(2-t)*



4. Represent behavior of the following circuit using *i(t)* and *v(t)* as input.



$$v(t) = v_R + v_R + v_R = Ri(t) + L\frac{di(t)}{dt} + \frac{1}{C}\int_0^t i(\tau)d\tau$$

after differentiation

$$\frac{dv(t)}{dt} = R\frac{di(t)}{dt} + L\frac{d^2v(t)}{dt^2} + \frac{1}{C}i(t)$$