**EEL 3135: Signals and Systems**

**Practice test Fall 2018**

Solve either problem 2 or problem 3 but do not solve both. Test duration: 1hour and 15 minutes.

**Problem 1:**

Let y(t)= r(t+2)-r(t+1)+r(t)-r(t-1)-u(t-1)-r(t-2)+r(t-3), where r(t) is the ramp function.

1. plot y(t)
2. plot y’(t)
3. Plot y(2t-3)
4. calculate the energy of y(t)

note: $r\left(t\right)=t for t\geq 0 and 0 for t<0$

**Problem 2:**

Let x(t) = u(t)-u(t-2) and y(t) = t[u(t)-u(t-1)]

1. plot x(t) and y(t)
2. evaluate graphically and plot $z\left(t\right)=x(t)\*y(t)$

**Problem 3:**

An LTI system has the impulse response

$$h\left(t\right)=5e^{-t}u\left(t\right)-16e^{-2t}u\left(t\right)+13e^{-3t}u(t)$$

The input is $x\left(t\right)=7\cos(\left(2t\right)). $Compute the output $y(t)$.

 Notice that $x\left(t\right)\*\left[h\_{1 }\left(t\right)+h\_{2}\left(t\right)+h\_{3}\left(t\right)\right]=x\left(t\right)\*h\_{1}$(t) +$x\left(t\right)\*h\_{2}\left(t\right)+x\left(t\right)\*h\_{3}(t)$.

**Problem 4:**

Find all the complex numbers z such that



Give your answer in rectangular form