

ECE 360
HOMEWORK #10
Due December 4, 2002

- Read 7.1-7.3, 17.1-17.5 from Ambardar.
- Office Hours: M,T 10:00-11:30 am, F 12:00-1:30 pm.
- The final exam is on December 9 12:45-2:45 pm.

1. Convolution Exercises: 7.3d, 7.15 c, 7.17b
2. 7.32 a
3. 17.44 a, e, i You can use the properties of z-transform.
4. Determine the sequence associated with each of the z-transforms given below:

a) $X(z) = \frac{1 - 2z^{-1}}{1 - \frac{5}{2}z^{-1} + z^{-2}}$, $x[n]$ is right-sided.

b) $X(z) = \frac{4z}{(z+1)^2(z+3)}$, $|z| > 3$

c) $X(z) = \frac{z^2}{(z-0.5)(z-1)}$, $x[n]$ is left-sided.

d) $X(z) = \frac{z^2}{(z^2 + z + 0.5)(z+1)}$, $x[n]$ is right-sided.

5. A causal LTI system is described by the difference equation

$$y[n] = y[n-1] + y[n-2] + x[n-1]$$

- a) Find the transfer function $H(z)$. Plot the poles and zeros of $H(z)$ and indicate the region of convergence.
 - b) Find the impulse response of this system.
 - c) You should have found this to be an unstable system. Find a stable (noncausal) impulse response that satisfies the same difference equation.
6. 17.17 a, d