EE 451

Homework #3

Due September 7, 2001
(Updated September 6,2001)

1. Problem 2.47 from the text.

2. Problem 2.58 from the text.

3. Problem 2.68 from the text.

4. Determine the impulse response $h[n]$ of the LTI system described by the difference equation

$$y[n] + 0.5y[n-1] = x[n] - 2x[n-2]$$

   Is the system stable? Why or why not?

5. Determine the total solution for $n \geq 0$ for the difference equation

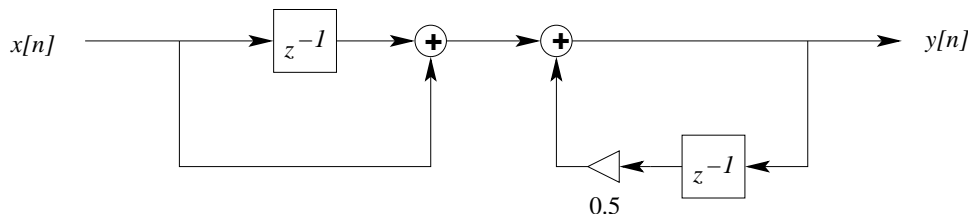$$y[n] - 3y[n-1] - 4y[n-2] = x[n] + 2x[n-1]$$

   when the input sequence is
$$x[n] = 4^n \mu[n]$$

   and the system is initially at rest.

   Is the system stable? Why or why not?

6. Consider the system shown below:

   (a) Determine its impulse response $h[n]$.

   (b) Show that $h[n]$ is equal to the convolution of the following signals:

$$\begin{aligned} h_1[n] &= \delta[n] + \delta[n-1] \\ h_2[n] &= \left(\tfrac{1}{2}\right)^n \mu[n] \end{aligned}$$