Homework No. 2

Due 15:10, Oct. 24, 2012

1. Find $y[n] = x[n] * h[n]$ of the following the signals:

   (1) $x[n] = (-1)^n \left(u[n] - u[n-5]\right)$ and $h[n] = u[n+2]$. (10%)

   (2) $x[n] = u[n] - u[-n]$ and $h[n] = \begin{cases} \left(\frac{1}{2}\right)^n, n \geq 0 \\ 4^n, n < 0 \end{cases}$. (20%)

2. Evaluate the following continuous-time convolution integrals: (20%)

$$y(t) = 2t^2 \left[u(t+1) - u(t-1)\right] * 2u(t+2).$$

3. Plot the continuous-time signal $x(t) = e^{-0.1t} \sin\frac{2}{3}t$ for t ranging from 0 to 30 seconds using **MATLAB**. (10%)

4. Consider the impulse response $h[n] = \sin(0.5n)$ for $n \geq 0$, and the input $x[n] = \sin(0.2n)$ for $n \geq 0$.

   (1) Plot $h[n]$ and $x[n]$ for $n = 0,1,...,40,$ using **MATLAB**. (20%)

   (2) Plot the output $y[n] = x[n] * h[n]$ for $n = 0,1,...,40,$ using **MATLAB**. (20%)

   Do not use MATLAB's built-in function!