1. Plot the following functions for \(-7 \leq n \leq 7\), using MATLAB. You can use `plot` and `stem` functions. Attach your results in your document.
   i. \(X[n] = \cos \left( 2\pi t^2 + \frac{3\pi}{4} \right)\)
   ii. \(Y[t] = u(t + 1) - u(t - 1)\)
   iii. \(V(t) = \sin \left( \frac{t}{4} \right) \cdot \cos \left( -\frac{t}{3} + \frac{2\pi}{3} \right)\)
   iv. \(W(t) = (e^{2jt} - e^{-jt}) \cdot \cos \left( \frac{t}{5} - \frac{2\pi}{3} \right)\)
   v. \(Z(t) = \sum_{i=-3}^{3} \sum_{j=-4}^{4} Y(t + 10ij)\)

2. Assume \(Y(t) = e^{j(3t+t^3)}u(t)\), then:
   i. Find the real and imaginary parts of function using MATLAB.
   ii. Compute energy of the signal from \(-2\pi\) to \(4\pi\).

3. Consider the impulse response and input
   \[
   \begin{cases}
   h[n] = u[n + 2] & 2 \leq n \leq 14 \\
   x[n] = (\frac{3}{5})^{n-2} u[n - 2] & 0 \leq n \leq 14 
   \end{cases}
   \]
   i. Use `conv` (read help for `conv`) function to calculate the convolution of \(h\) and \(x\) and sketch them.
   ii. Calculate \(y[n] = x[n - 2] * h[n]\) and compare the result with part (i). Is this system time-invariant? Justify your answer.

4. Assume impulse response \(h[n] = \delta[n + 1] + \delta[n - 1]\) and the input \(x[n] = \delta[3n] - 2\delta[n+1]\). Define the vectors \(h\) and \(x\) corresponding to these sequences. Use `conv` to compute output \(res[n]\). Determine a vector of time show corresponding to \(y\) and store them in the vector “out”. Plot \(res[n]\) as a function of \(n\) with command `stem(out,res).

- Send your homework in zipped folder named `Signal_HW1_STDID` to `psaco97@gmail.com`. For each day of delay your grade will decrease 15%.