6.6   Problems

1. Determine the DFS coefficients of the following periodic sequences using the DFS definition,

   (a) $\tilde{x}_1[n] = \{2, 0, 2, 0\}$, $N = 4$.

   (b) $\tilde{x}_2[n] = \{0, 0, 1, 0, 0\}$, $N = 5$.

   (c) $\tilde{x}_3[n] = \{3, -3, 3, -3\}$, $N = 4$.

   (d) $\tilde{x}_4[n] = \{j, j, -j, -j\}$, $N = 4$.

   This problem should be done with paper-and-pencil, but you may verify your answers in matlab.

2. *Note: this problem should be done in matlab.* A 12 point sequence $x[n]$ is defined as

$$x[n] \quad = \quad \{1, 2, 3, 4, 5, 6, 6, 5, 4, 3, 2, 1\}$$

   (a) Determine the DFT $X(k)$ of $x[n]$. Plot (using the *stem* function) its magnitude and phase.

   (b) Plot the magnitude and phase of the DTFT $X(e^{j\omega})$ of $x[n]$ using matlab.

   (c) Verify that the above DFT is the sampled version of $X(e^{j\omega})$. It might be helpful to combine the above two plots in one graph using the *hold* command.