Home Project №4

Due on July 10, 2009

Exercise 1

Consider the real finite-length sequence $x[n]$ shown in Figure P8.26-1.

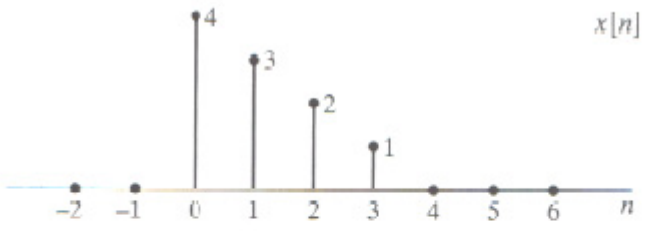

Figure P8.26-1

(a) Sketch the finite-length sequence $y[n]$ whose six-point DFT is

$$Y[k] = W_6^{4k} X[k],$$

where $X[k]$ is the six-point DFT of $x[n]$.

(b) Sketch the finite-length sequence $w[n]$ whose six-point DFT is

$$W[k] = \mathcal{R}e\{X[k]\}.$$

(c) Sketch the finite-length sequence $q[n]$ whose three-point DFT is

$$Q[k] = X[2k], \qquad k = 0, 1, 2.$$

Exercise 2

The following is a Matlab exercise that concerns the chirp transform algorithm. Matlab code should be attached to the solution.

- Load the signal 'mishmash' of length 128 to your Matlab workspace using wnoise.m.
- Plot the absolute value of its DFT.
- Implement the chirp transform algorithm, and apply it to the signal to obtain 1000 samples between $\omega_0 = 2\frac{rad}{sec}$ and $\omega_1 = 2.5\frac{rad}{sec}$. Plot the absolute value of the transform in that range.
- Plot the transform obtained by czt.m and compare it to your results.