Signals and Systems
Fall 2013

Issued: 27 September 2013
Due: 4 October 2013

Homework Assignment #6

1. Find the *z* transform of each of the following sequences.

(a) $f(k) = 2\delta(k) - \delta(k-2) = \begin{cases} 2, & k = 0 \\ -1, & k = 2 \\ 0 & \text{otherwise} \end{cases}$

(b) $f(k) = \begin{cases} 0, & k < 0 \\ 1, & 0 \le k \le 5 \\ 2^{k-5}, & k \ge 5 \end{cases}$.

(c) $f(k) = \{2,2,0,-1,-1,-1,2,2,0,-1,-1,-1,2,2,0,-1,-1,-1,\cdots\}$.
[Hint: Express $f(k)$ as the sum of shifted, identical, finite sequences.]

(d) $f(k) = \begin{cases} 2, & k \text{ odd} \\ 0, & k \text{ even} \\ 0, & k \le 0 \end{cases}$.

(e) $f(k) = a^{k-1}u_s(k-1) + \frac{1}{a}\delta(k)$

2. Find the *z* transform of each of the following sequences.

(a) $f(k) = (0.5)^k \cos(k\frac{\pi}{4})u_s(k)$.

(b) $f(k) = (0.5)^{(k-2)} \cos((k-2)\frac{\pi}{4})u_s(k-2)$.

(c) $f(k) = (0.5)^k \cos(k\frac{\pi}{4})u_s(k-2)$.

(d) $f(k) = (0.2)^k u_s(k) + (-2)^{k-1}u_s(k)$.

(e) $f(k) = (0.2)^k u_s(k) + (-2)^{k-1}u_s(k-1)$.