EE 3054: Signals, Systems, and Transforms

Lab Quiz 1 — Spring 2006

No laptop, no notes, no documentation.

1. Given the following array `a`,

```
a =

     3      7       6      4
     9      4      10      2
     1      8       3      5
```

determine the result of each of the following commands.

```
>> a(4, 3)
>> a(3, 1)
>> a(0, 2)
>> a(5)
>> a'
>> a([2 3], [3 4])
>> a([2 1], [2 3])
>> a(3:-1:1, 4:-1:1)
>> a([2 2], :)
>> a(end, 2)
>> max(a)
>> a(:)
>> b = a; b([1 3],[2 4]) = [-1 -2; -3 -4]; b
>> b = a; b(:,2) = []; b
>> a > 5
```

2. Given the following vector `a`,

```
a =

     3      7       6      4      9
```

determine the result of each of the following commands.
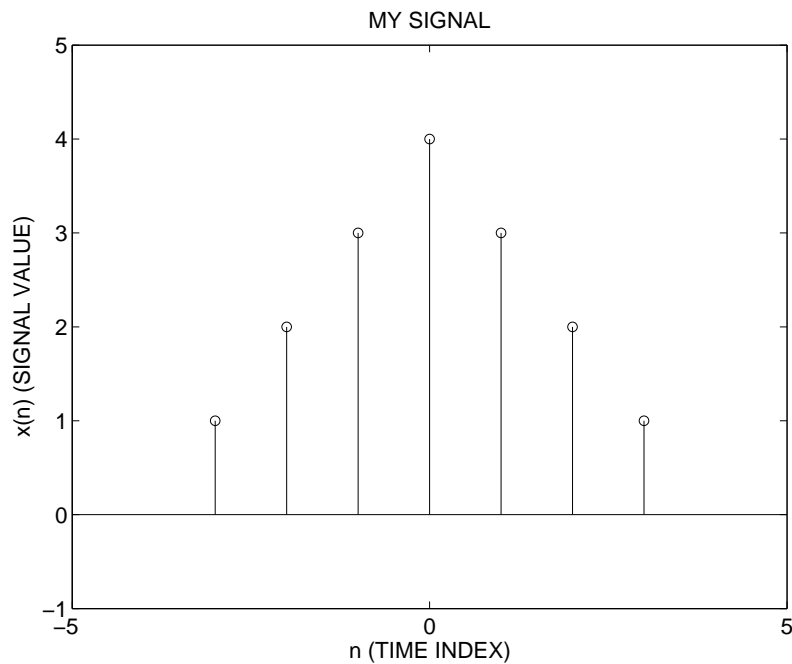
```
>> a(3)
>> a(1,3)
```

```
>> a(3,1)
>> find(a > 5)
>> a * a
>> a .* a
>> [a, a]
>> [a; a]
>> [M, k] = min(a); M, k
```
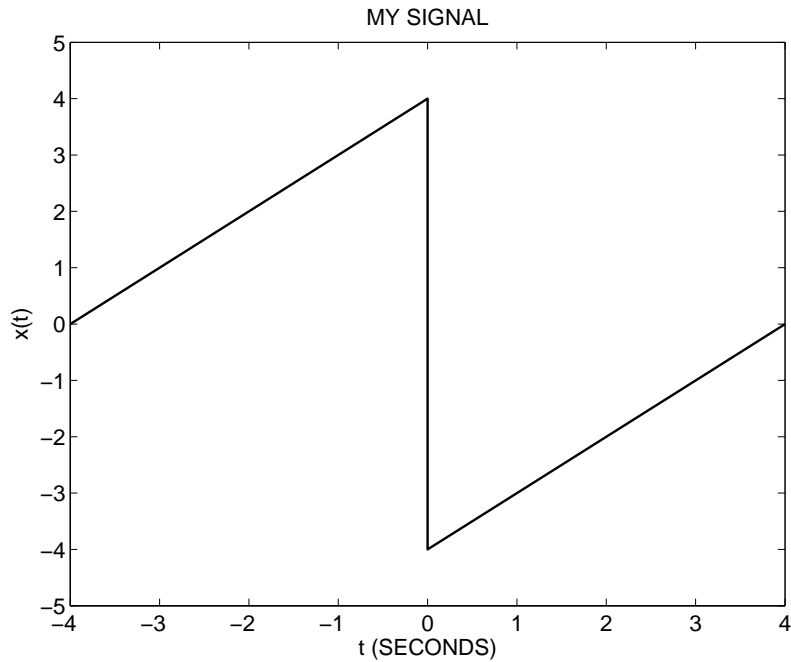
3. What is the result of the following commands?

```
>> a = [2 1 3];
>> b = [-1 -2 -3];
>> conv(a,b)
```

4. Write a MATLAB code fragment to generate the following figure, including axis labels, and title.

5. Write a MATLAB code fragment to generate the following figure, including axis labels, and title.

MY SIGNAL

6. Suppose a system is implemented with the difference equation:

$$y(n) = x(n) + 2\,x(n-1) + 1.5\,x(n-2) - 0.95\,y(n-1) - 0.1\,y(n-2)$$

Write your own Matlab function, `mydiffeq`, to implement this difference equation using a `for` loop. If the input signal is N-samples long $(0 \le n \le N-1)$, your program should find the first N sample of the output $y(n)$ $(0 \le n \le N-1)$.

Use the intial conditions,

$$x(-1) = 1.1, \quad x(-2) = 0.5$$

$$y(-1) = 0 - 0.3, \quad y(-2) = 0.2$$