Signal and System
MATLAB Homework #1

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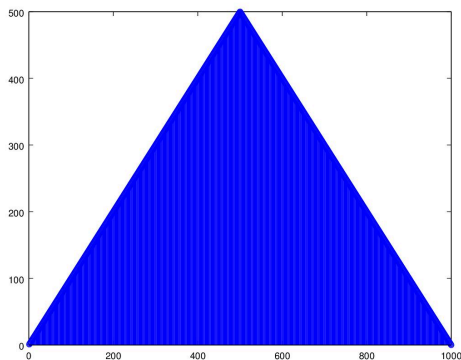
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1. Use the command stem to plot $x_1[n]$ and $x_2[n]$.
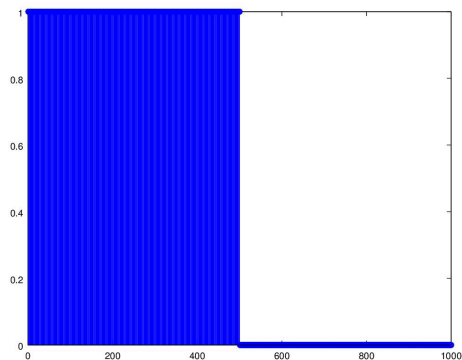
   Here is the code I used.

```matlab
1  x1 = zeros(1, 1000);
2
3  for i = 1:1000
4      if i <= 500
5          x1(i) = i;
6      elseif i <= 999
7          x1(i) = 999 - i + 1;
8      else
9          x1(i) = 0;
10     end
11 end
12 stem(x1)
13 print -djpg p1.jpg % Save fig to p1.jpg
14 pause()
15
16 x2 = [ones(1, 500), zeros(1, 500)];
17 stem(x2)
18 print -djpg p2.jpg % Save fig to p2.jpg
19 pause()
```

   And here is the plots.

(a) Plot of $x_1[n]$ (b) Plot of $x_2[n]$

2. Use the command conv to compute (1).

Continue from (1)

```matlab
1  y = conv(x1, x2);
2
3  stem(y)
4  print -djpg p3.jpg % Save fig to p3.jpg
5  pause()
```
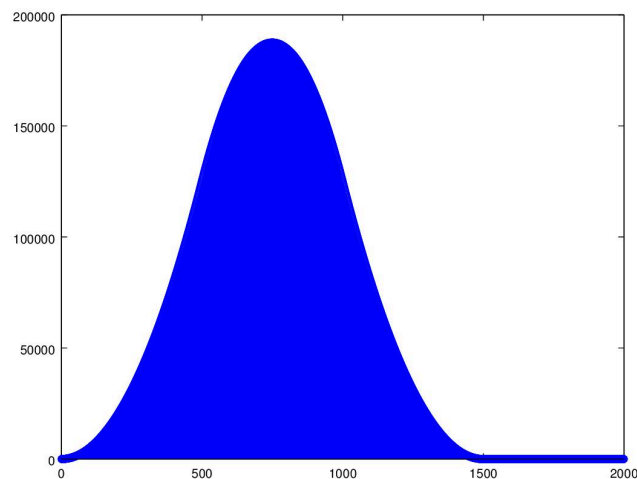
And here is the plot.

Figure 2: Plot of $y = x1 * x2$

3. Write a MATLAB function my1conv.m to compute (1) directly and plot y when

$$x_1 = x_2 = \begin{cases} 1, & n = 1, 2, \cdots, 500 \\ 0, & \text{elsewhere} \end{cases}$$

The function is at the file **my1conv.m**, and then use the code below

```matlab
1  x1 = ones(1, 500);
2  x2 = ones(1, 500);
3
4  y = my1conv(x1, x2);
5  stem(y);
6  print -djpg p4.jpg % Save fig to p4.jpg
7  pause();
```

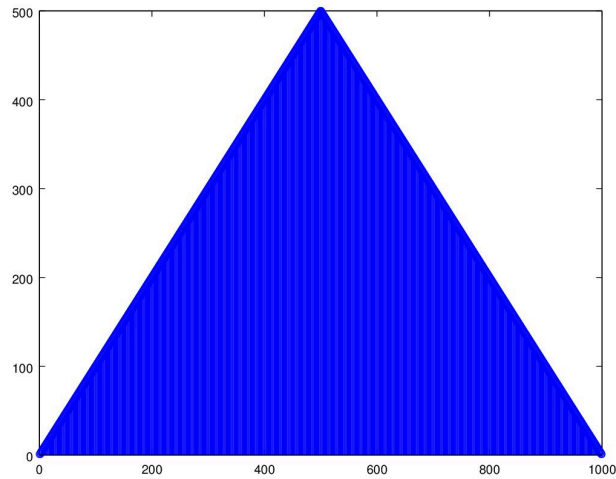to compute the result. Below is the plot.

Figure 3: Plot of $y = x1 * x2$

4. Write a MATLAB function my2conv.m to compute (1) using (2) and plot y when

$$x_1 = \begin{cases} 1, & n = 1, 2, \cdots, 500 \\ 0, & \text{elsewhere} \end{cases}$$

and

$$x_2 = \begin{cases} 1, & n = 1, 2, \cdots, 1001 \\ 0, & \text{elsewhere} \end{cases}$$

The function is at the file my2conv.m, and then use the code below

```
1  x1 = ones(1, 500);
2  x2 = ones(1, 1001);
3
4  y = my2conv(x1, x2);
5  stem(y);
6  print -djpg p5.jpg % Save fig to p5.jpg
7  pause();
```
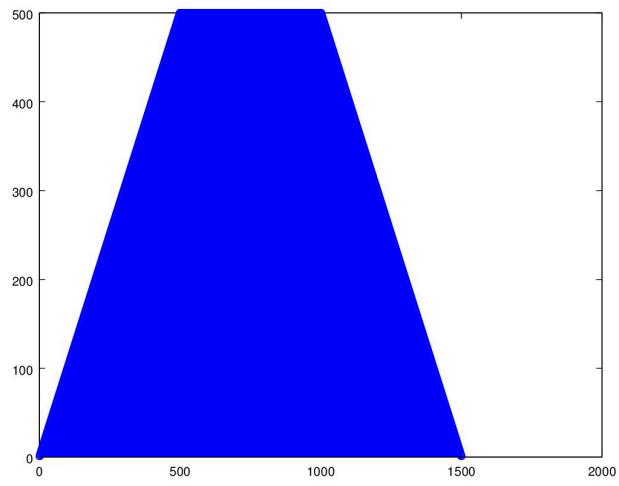
to compute the result. Below is the plot.

3

Figure 4: Plot of $y = x1 * x2$