EGN3204 — Engineering Software Tools
Pensacola (11193) Section
Spring 2017
Problem Set #8 (1 March, 2017 Lecture)
MATLAB R2015a, Word 2103

Benjamin Linam

1. Figure 1 is the Matlab script code required for problem 1. The script file creates a rectangular pulse wave, sinc wave, and sinusoidal wave. Figure 2 is the plotted graph created in the script showing all three wave forms.

```
%Benjamin Linam, EGN 3204, Spring 2017

%Matlab m file


t = linspace (-5e-6,5e-6,4000);

rect_pulse =5*square(t*(8e5*pi),60);

sinc_wave = 7*sinc(t*(4e5*pi));

sinusoid = 5*cos(t*(1e6*pi)) - 1;

%Creation of each wave form


plot(t,rect_pulse,'r-',t,sinc_wave,'b-',t,sinusoid,'k-','LineWidth',2)

%plots the waves with specific formatting from below

xlabel('time(s)')

ylabel('oscilloscope reading (V)')

title('Benjamin Linam')

axis([-5e-6 5e-6 -5 10])

set(gca,'XTick',-5e-6:1e-6:5e-6)

set(gca,'YTick',-5:1:10)

grid on

legend('rectangular pulse
wave','sincwave','sinusoid','Location','northwest')
%Creates a legend box with the information above
```

Figure 1. MATLAB script code for problem 1 with appropriate commenting.

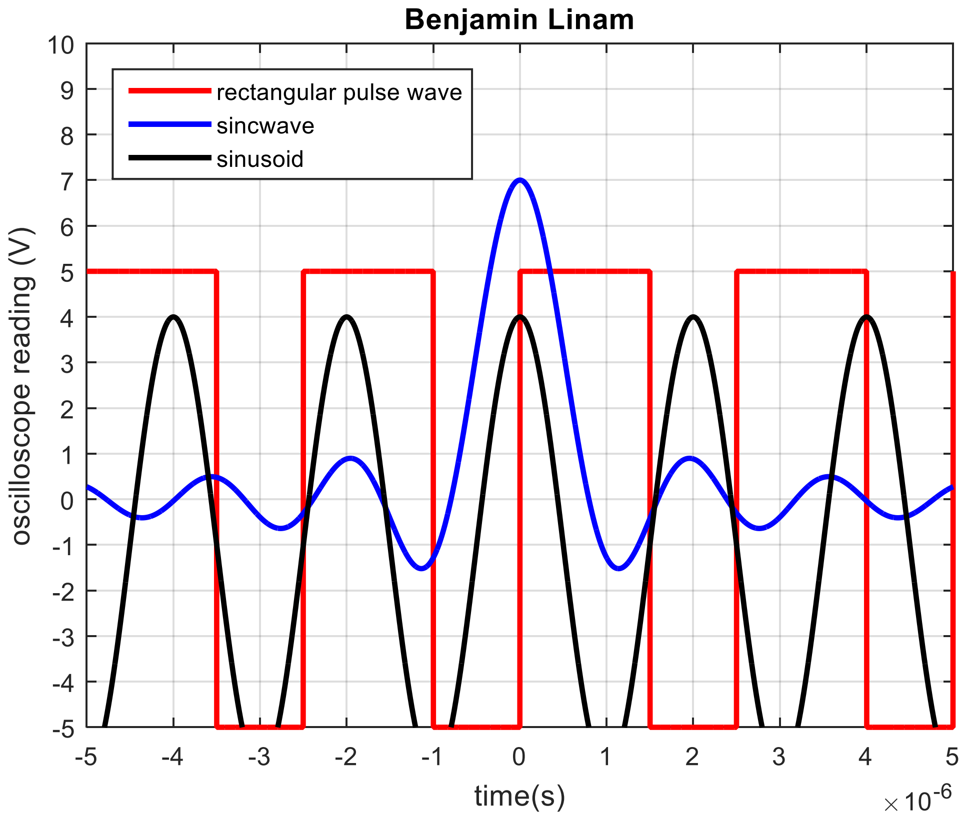

Figure 2. Plotted graph created in Matlab script file showing rectangular wave, sincwave, and sinusoidal wave.

Based on figure 2, the period of the 60% duty cycle rectangular pulse train is 2.5e-6 seconds while the period of the sinusoidal wave is 2e-6 seconds.

2. Figure 3 is the Matlab script code required for problem 2. The script file creates three stem graphs for the following functions: x1[n] = 1.05^n, x2[n] = 0.75^n, and x3[n] = 0.6^n. Figures 4, 5, 6 show the respecting stem graphs of the three functions.

```
%Benjamin Linam, EGN 3204, Spring 2017

%Matlab m file

n = linspace(-10,10,20);

x1 = 1.05.^(n);

x2 = 0.75.^(n);

x3 = 0.6.^(n);

%Function definitions

figure(1)

stem(n,x1, 'K', 'fill', 'LineWidth',2)

xlabel('n')

ylabel('x1[n] = 1.05.^(n)')

title('Benjamin Linam')

set(gca, 'XTick',-10:1:10)

grid on

%Graphs figure of function 1

figure(2)

stem(n,x2, 'K', 'fill', 'LineWidth',2)

xlabel('n')

ylabel('x[n] = 0.75.^(n)')

title('Benjamin Linam')

set(gca, 'XTick',-10:1:10)

grid on

%Graphs figure of function 2

figure(3)
```

```
stem(n,x3, 'K', 'fill', 'LineWidth',2)

xlabel('n')

ylabel('x3[n] = 0.6.^(n)')

title('Benjamin Linam')

set(gca, 'XTick',-10:1:10)

grid on

%Graphs figure of function 3
```

Figure 3. MATLAB script code for problem 2 with appropriate commenting.

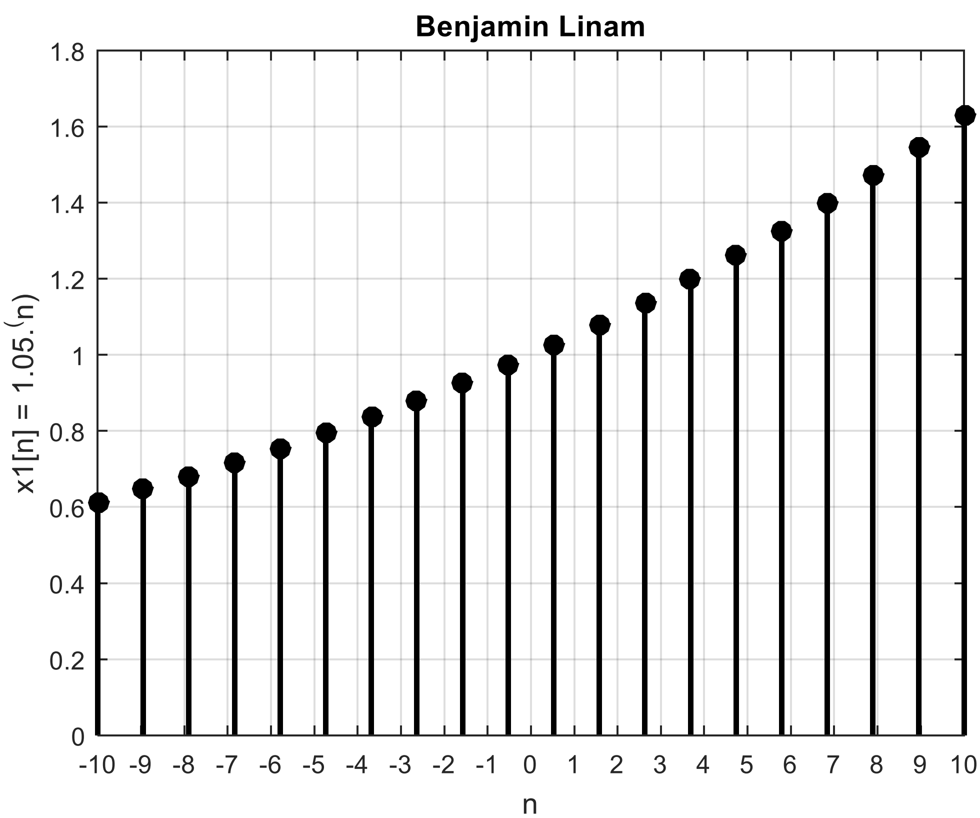

Figure 4. Stem plot of function x1.

Based on figure 4, $\lim_{n\to-\infty} x_1[n] = 0$ and $\lim_{n\to\infty} x_1[n] = \infty$.

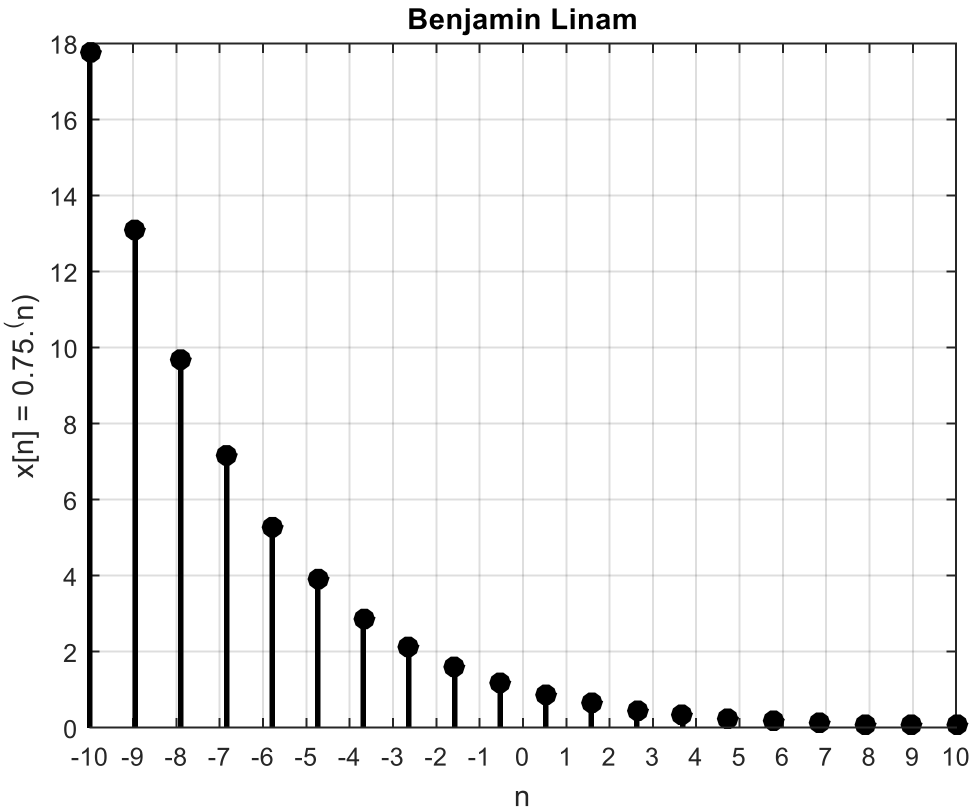

Figure 5. Stem plot of function x2.

Based on figure 5, $\lim_{n \to -\infty} x_1[n] = \infty$ and $\lim_{n \to \infty} x_1[n] = 0$.

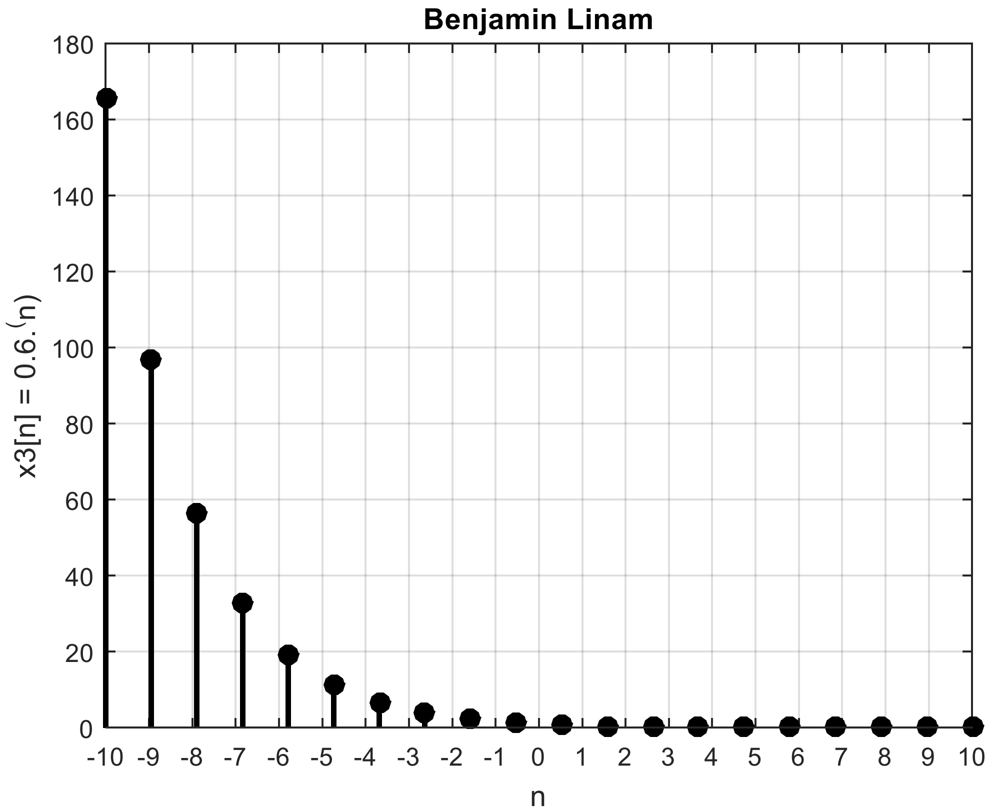

Figure 6. Stem plot of function x3.

Based on figure 6, $\lim_{n\to-\infty} x_1[n] = \infty$ and $\lim_{n\to\infty} x_1[n] = 0$.