CTFT Octave Codes (3A)

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This document was produced by using OpenOffice and Octave.

Based on
M.J. Roberts, Fundamentals of Signals and Systems

Normalized ω_s and ω_0

```
NF = 32;
Ts = 2/NF;
fs = 1/Ts;
fF = fs/NF;
n = [0:NF-1]';
t = n*Ts;
x = t.*(1-t).*rect((t-1/2));
X = Ts*fft(x);

k = [0:NF/2-1];
```

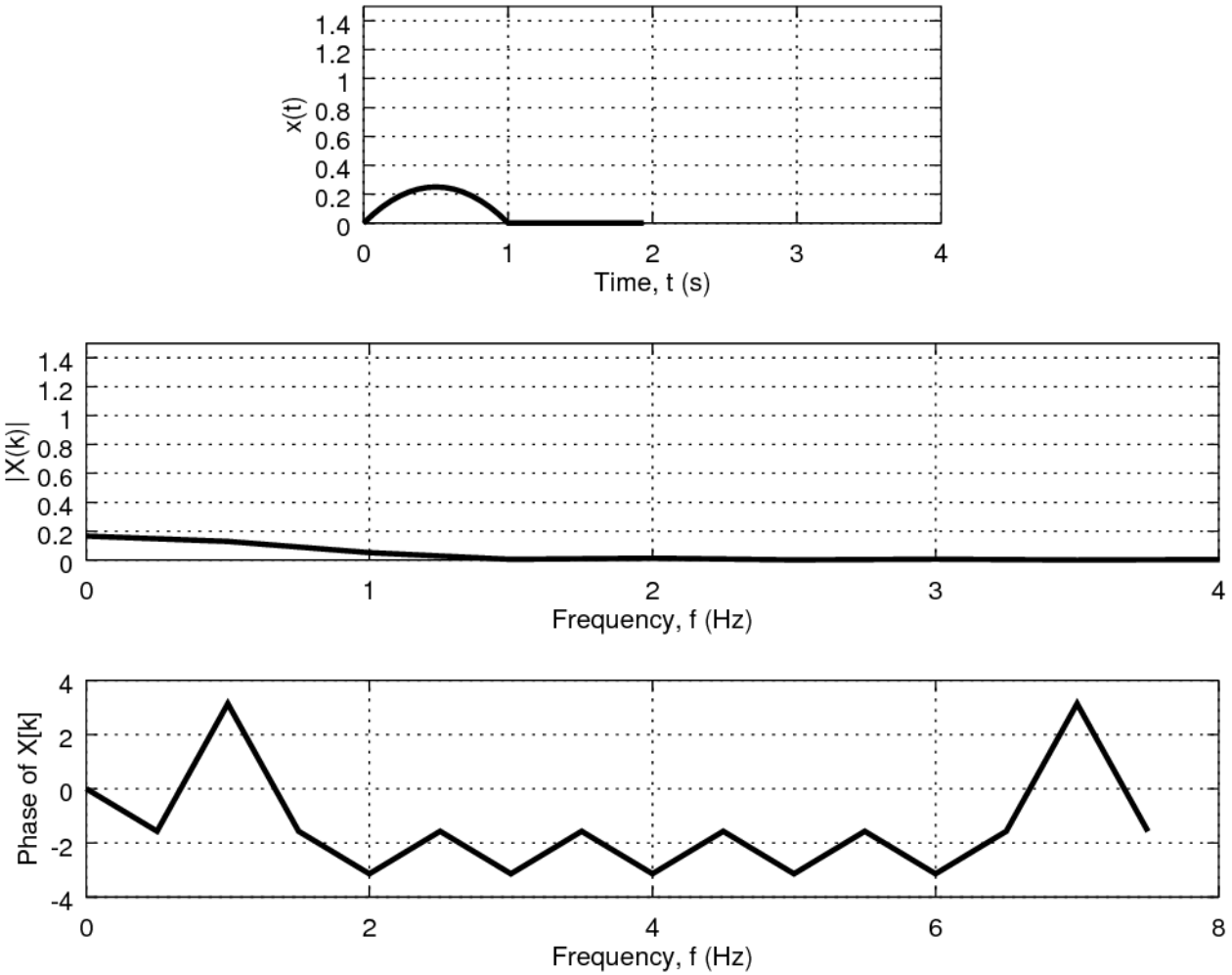
Normalized ω_s and ω_0

```
subplot(3,1,1);
p = plot(t,x,'k'); grid on;
set(p, 'LineWidth',2);
axis('equal'); axis([0,4,0,1.5]);
xlabel('Time, t (s)');
ylabel('x(t)');

subplot(3,1,2);
p = plot(k*fF,abs(X(1:NF/2)),'k');
set(p,'LineWidth',2); grid on;
axis([0,4,0,1.5]);
xlabel('Frequency, f (Hz)');
ylabel('|X(k)|');

subplot(3,1,3);
p = plot(k*fF,angle(X(1:NF/2)),'k');
set(p,'LineWidth',2); grid on;
xlabel('Frequency, f (Hz)');
ylabel('Phase of X[k]');
```

Normalized ω_s and ω_0



Normalized ω_s and ω_0

```
NF = 32;
Ts = 2/NF;
fs = 1/Ts;
fF = fs/NF;
n = [0:NF-1]';
t = n*Ts;
x = t.*(1-t).*rect((t-1/2));
X = fftshift(Ts*fft(x));

K = [-NF/2:NF/2-1];
```

Normalized ω_s and ω_0

```
subplot(3,1,1);
p = plot(t,x,'k'); grid on;
set(p, 'LineWidth',2);
axis('equal'); axis([0,4,0,1.5]);
xlabel('Time, t (s)');
ylabel('x(t)');

subplot(3,1,2);
p = plot(k*fF,abs(X),'k');
set(p,'LineWidth',2); grid on;
axis([0,4,0,1.5]);
xlabel('Frequency, f (Hz)');
ylabel('|X(f)|');

subplot(3,1,3);
p = plot(k*fF,angle(X),'k');
set(p,'LineWidth',2); grid on;
xlabel('Frequency, f (Hz)');
ylabel('Phase of X(f)');
```

References

[1] http://en.wikipedia.org/
[2] J.H. McClellan, et al., Signal Processing First, Pearson Prentice Hall, 2003
[3] M.J. Roberts, Fundamentals of Signals and Systems
[4] S.J. Orfanidis, Introduction to Signal Processing
[5] K. Shin, et al., Fundamentals of Signal Processing for Sound and Vibration Engineerings

[6] A “graphical interpretation” of the DFT and FFT, by Steve Mann