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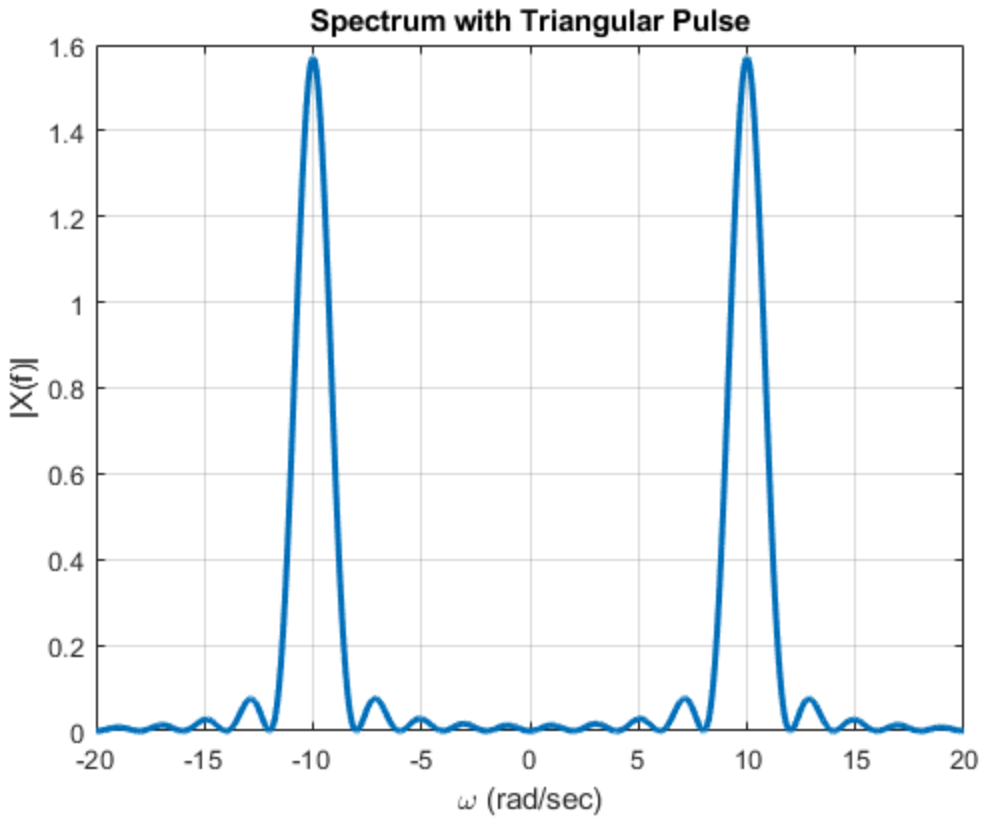
Project 1 – 2022

Find the Spectrum of Triangular and Rectangular modulated pulses and compare

```
clear; close all; clc;
w0 = 10; % Carrier frequency (rad/sec)
f0 = w0/(2*pi); % Carrier frequency (Hz)
Wmax = 20; % Maximum frequency (rad/sec)
Fmax = Wmax/(2*pi); % Max frequency (Hz)
```

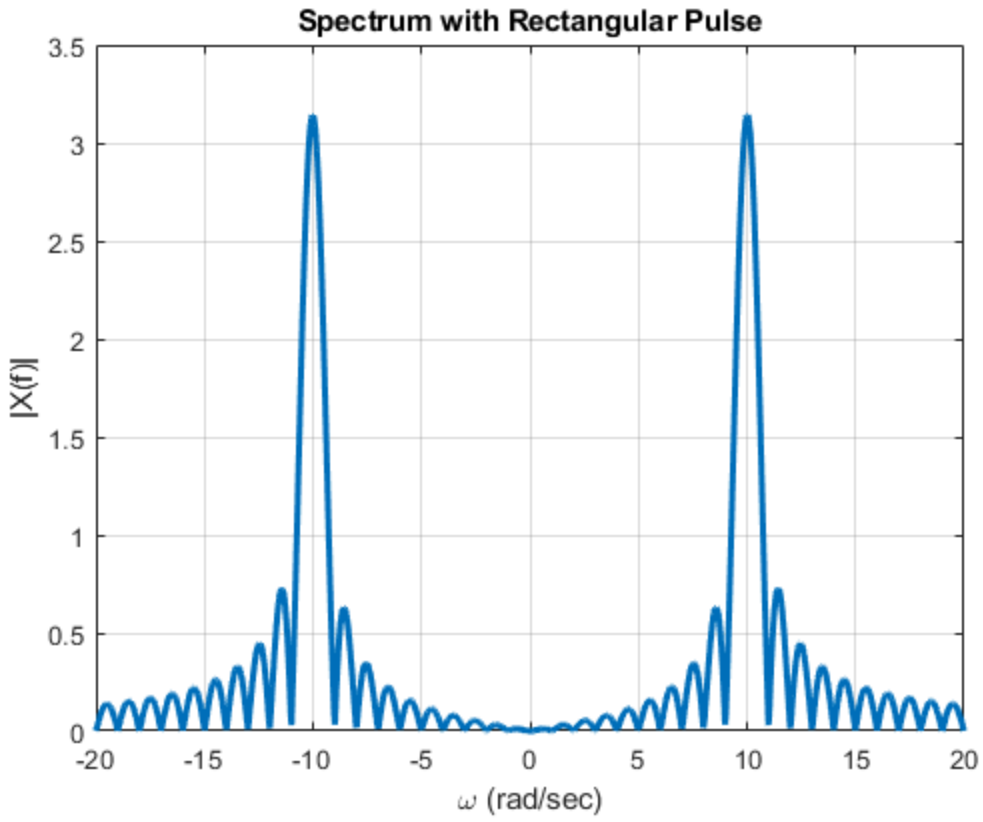
Triangular Pulse

```
f = linspace(-Fmax,Fmax,1000); % frequency vector
X1 = (pi/2)*(sinc(pi*(f + f0)).^2 + sinc(pi*(f - f0)).^2); %
 triangular pulse spectrum
figure(1)
plot(2*pi*f, abs(X1), 'LineWidth',2);grid % x-axis in rad/sec
xlabel('\omega (rad/sec)'); ylabel('|X(f)|')
title('Spectrum with Triangular Pulse')
```



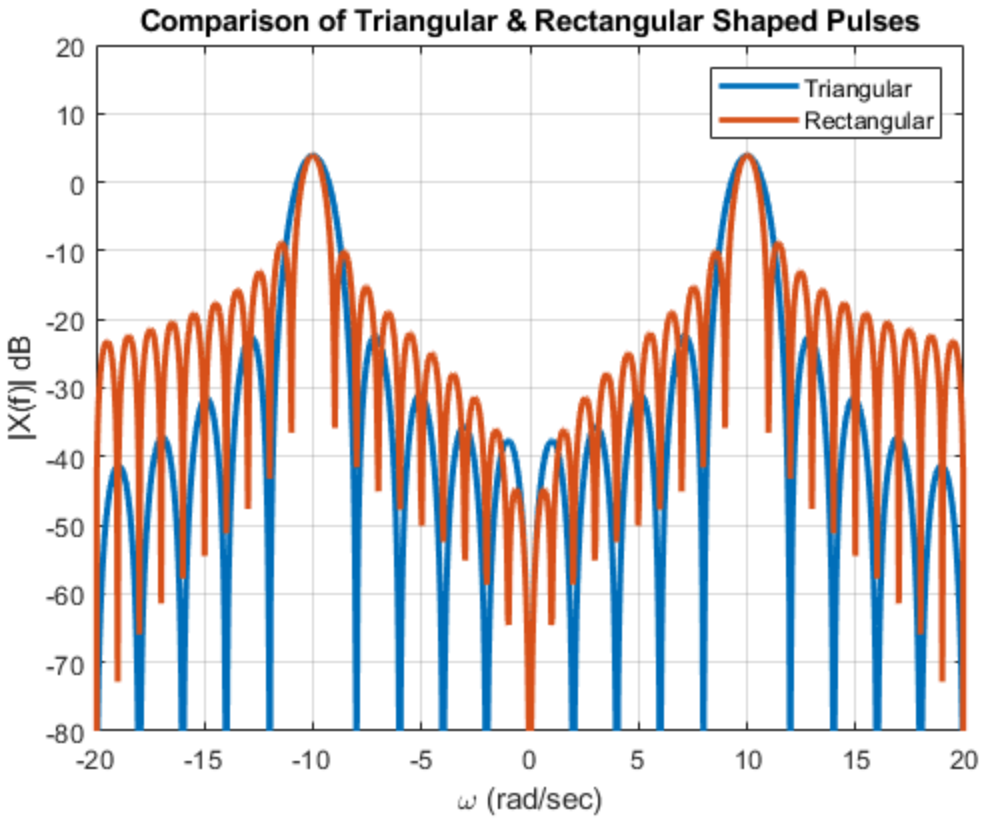
Rectangular Pulse

```
f = linspace(-Fmax,Fmax,1000); % frequency vector
X2 = (pi)*(sinc(2*pi*(f + f0)) + sinc(2*pi*(f - f0))); % rectangular
 pulse spectrum
figure(2)
plot(2*pi*f, abs(X2), 'LineWidth',2);grid % x-axis in rad/sec
xlabel('\omega (rad/sec)'); ylabel('|X(f)|')
title('Spectrum with Rectangular Pulse')
```



Comparison between Rectangular and Triangular pulses

```
figure(3)
plot(2*pi*f, 20*log10(abs(X1)), 'LineWidth',2); % magnitude in dB
hold on;
plot(2*pi*f, 20*log10(abs(X2)/2), 'LineWidth',2); % magnitude in dB
xlabel('\omega (rad/sec)'); ylabel('|X(f)| dB')
title('Comparison of Triangular & Rectangular Shaped Pulses')
axis([-20 20 -80 20]); grid on;
legend('Triangular','Rectangular')
```



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