Contents


```
clear; close all; clc;
```

```
%----- Setup
Tfull   = 0.5;           % Time interval of data to load
fsampIQ = 10.0e6;         % IQ sampling frequency (Hz)
fIF     = 5e6;          % Intermediate frequency (Hz)

N = floor(fsampIQ*Tfull);
nfft = 2^9;             % Size of FFT used in power spectrum estimation
%----- Load data
fid = fopen("C:\Users\gsh04\Desktop\2024-Fall\GPS\exam2\problem 3\niData03head_10MHz.bin",'r','l');
Y = fread(fid, [2,N], 'int16')';
Y = Y(:,1) + 1j*Y(:,2);
fclose(fid);
```

Pwelch from signal

```
%----- Compute power spectrum estimate
[Syy,fVec] = pwelch(Y,hann(nfft),[],nfft,fsampIQ);
%----- Plot results
% figure,
% yLow = -60;
% yHigh = 50;
% T = nfft/fsampIQ;
% delf = 1/T;
% fcenter = (nfft/2)*delf;
% fVec = fVec - fcenter;
% Syy = [Syy(nfft/2 + 1 : end); Syy(1:nfft/2)];
% area(fVec/1e6,10*log10(Syy),yLow);
% ylim([yLow,yHigh]);
% grid on;
% shg;
% xlabel('Frequency (MHz)');
% ylabel('Power density (dB/Hz)');
% title('Power spectral density estimate from complex data');
% shg;
```

Convert to Bandpass Signal

```
Tl = 1/fsampIQ;
[xVec] = iq2if(real(Y),imag(Y),Tl,fIF);
[Syy2,fVec2] = pwelch(xVec,hann(nfft),[],nfft,2*fsampIQ);
%----- Plot results
figure,
yLow2 = -60;
```