

---

```
% m-file to examine barker code
clear all

N = 13;
tb = 2e-6;
T = N*tb;
dt = tb/10;
t = 0:dt:2*T;
t = t+tb/8;
t = transpose(t);
wc = -40e3;

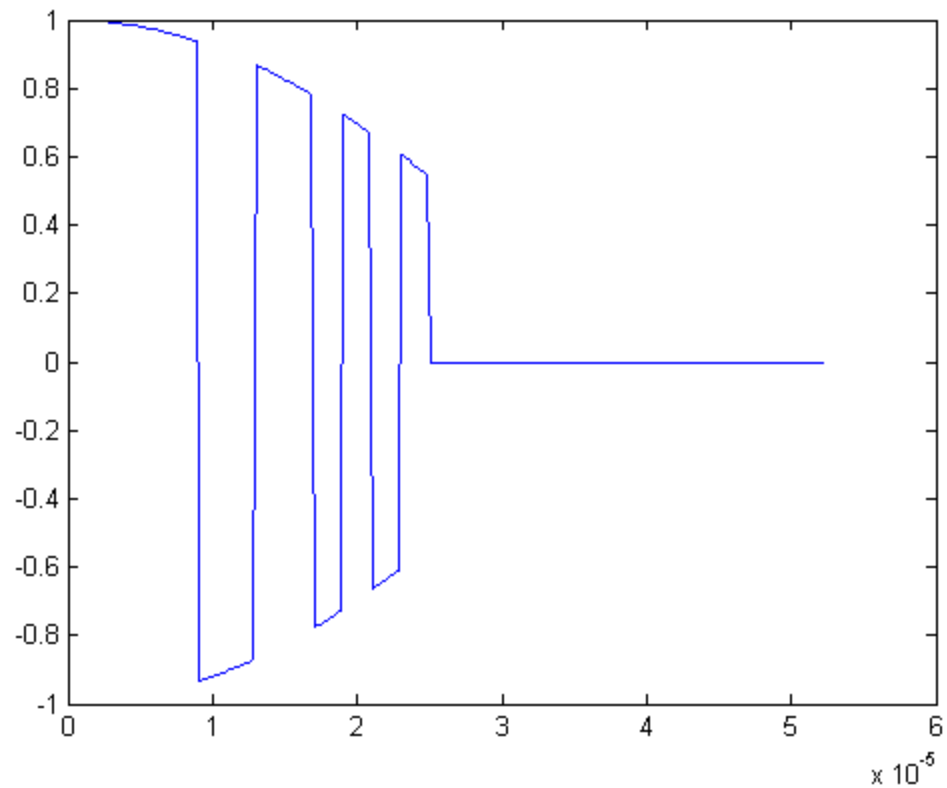
um = [1 1 1 1 1 -1 -1 1 1 -1 1 -1 1];

u = zeros(size(t));
for ii=1:N
    u = u + um(ii)*rect((t-(ii-1)*tb)/tb);
end

% Normalization
mag = sqrt(max(u.*conj(u)));
u = u/mag;

% Adding Doppler/Carrier Frequency
s = real(u.*exp(1i*wc.*t));

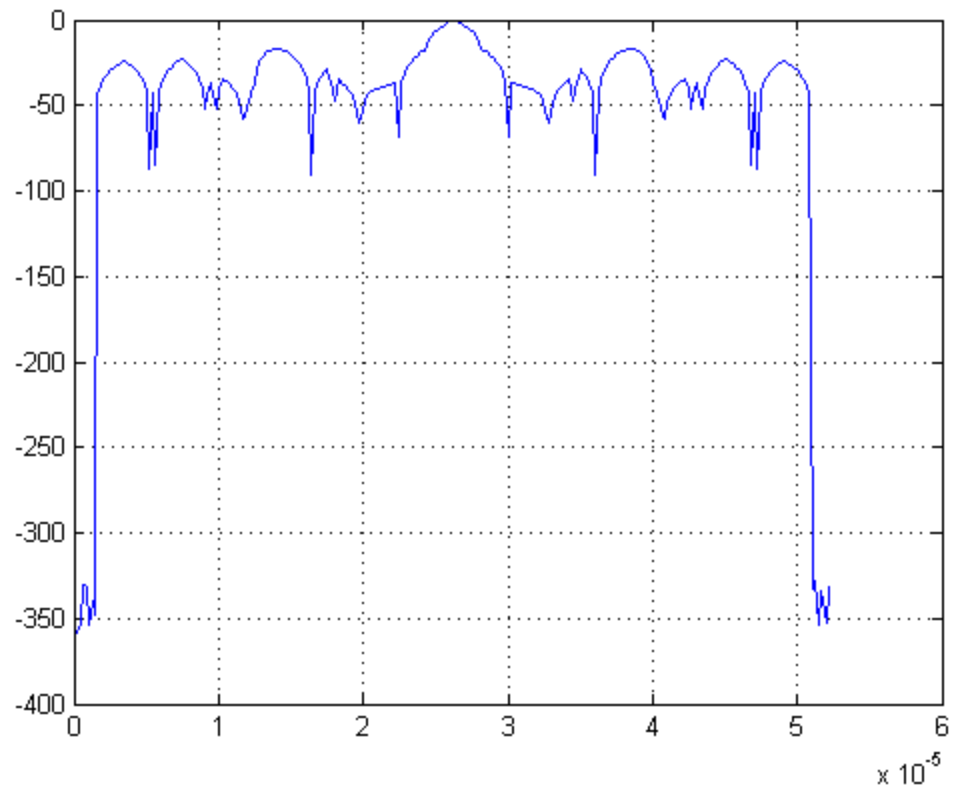
plot(t,s)
```



## Matched Filter

```
S = fft(s);  
V = S.*conj(S);  
v = ifft(V);  
  
vplot = 20*log10(fftshift(v/max(v)));  
  
plot(t,vplot)  
grid on
```

*Warning: Imaginary parts of complex X and/or Y arguments ignored*



## Least Mean Squares

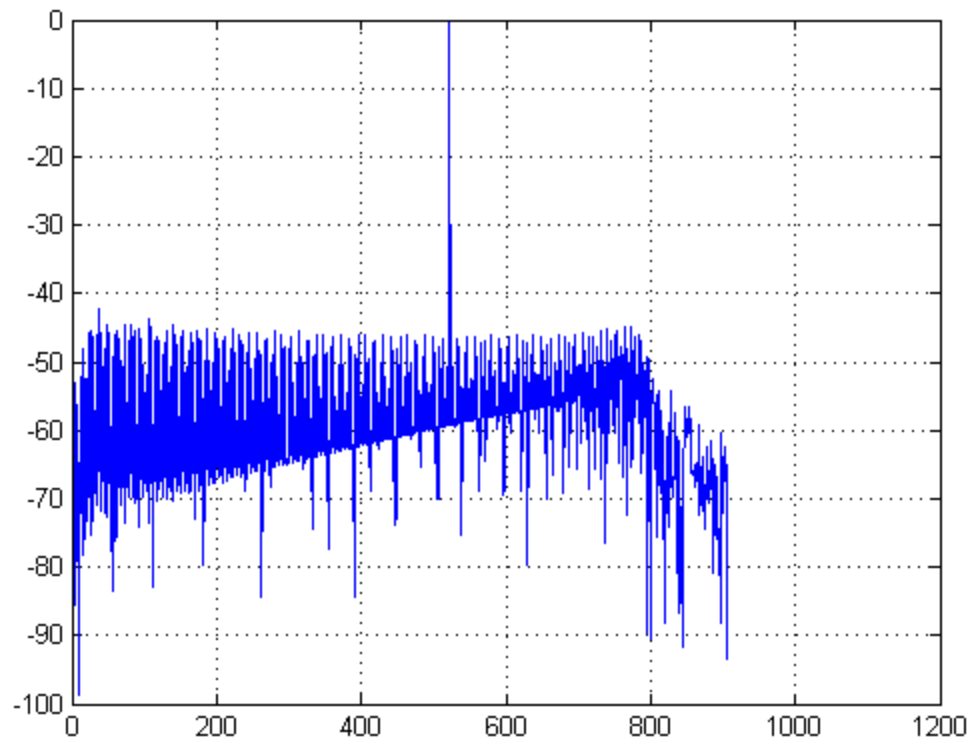
```
% filter length
M = 3*length(s);
T = M+length(s)-1;

% desired output
d = zeros(T,1);
d(ceil(T/2)) = 1;

% Obtain lmsPC kernel
h = lmsPC(shiftMatrix(s,M),d);

% Test
y = conv(s,h);

yplot = 20*log10(abs(y));
plot(yplot)
grid on
```



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