DC AHP-7

Name: C.P.Sindhu

SRN: PES1UG21EC071

Semester: 4th

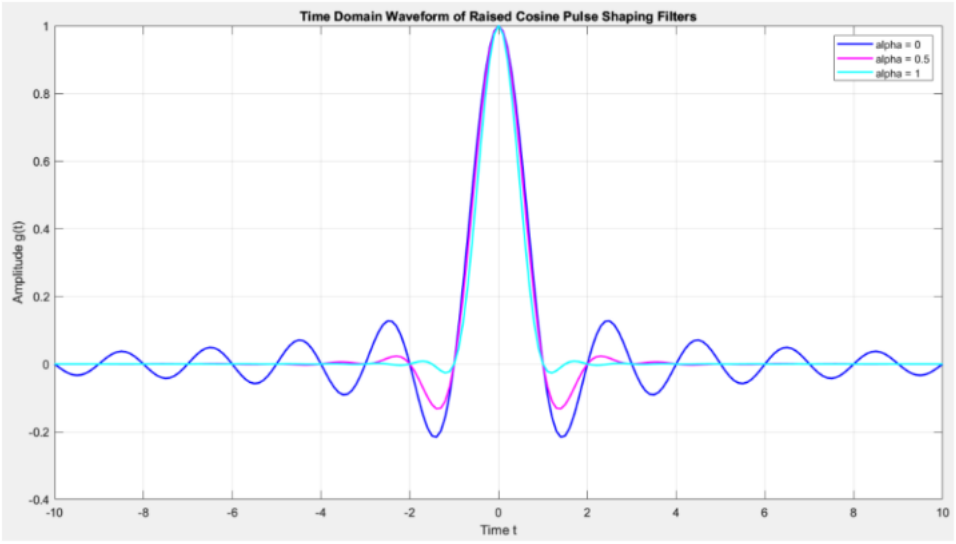
Section:'B'

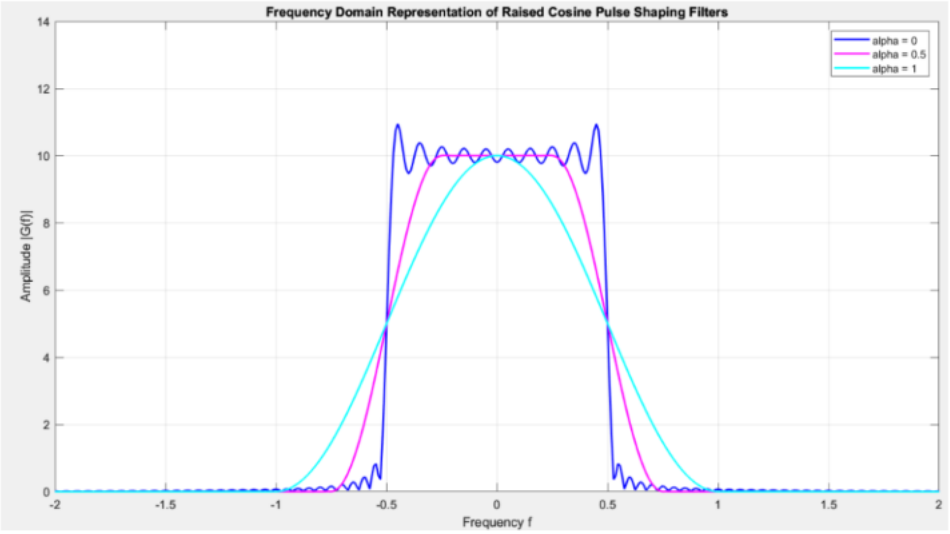
CODE:

```
clear all;
fs = 10;
%Defining the sinc function
sincNum = sin(pi*(-fs:1/fs:fs));
sincDen = (pi*(-fs:1/fs:fs));
sincDenZero = find(abs(sincDen) < 10^-10);
sincOp = sincNum./sincDen;
sincOp(sincDenZero) = 1; %sin(pix)/(pix) = 1 for x=0
alpha = 0;
cosNum = cos(alpha*pi*(-fs:1/fs:fs));
cosDen = (1-(2*alpha*(-fs:1/fs:fs)).^2);
cosDenZero = find(abs(cosDen)<10^-10);
cosOp = cosNum./cosDen;
cosOp(cosDenZero) = pi/4;
gt_alpha0 = sincOp.*cosOp;
GF_alpha0 = fft(gt_alpha0,1024);
alpha = 0.5;
cosNum = cos(alpha*pi*(-fs:1/fs:fs));
cosDen = (1-(2*alpha*(-fs:1/fs:fs)).^2);
cosDenZero = find(abs(cosDen)<10^-10);
cosOp = cosNum./cosDen;
cosOp(cosDenZero) = pi/4;
gt_alpha5 = sincOp.*cosOp;
GF_alpha5 = fft(gt_alpha5,1024);
alpha = 1;
cosNum = cos(alpha*pi*(-fs:1/fs:fs));
cosDen = (1-(2*alpha*(-fs:1/fs:fs)).^2);
cosDenZero = find(abs(cosDen)<10^-10);
cosOp = cosNum./cosDen;
cosOp(cosDenZero) = pi/4;
gt_alpha1 = sincOp.*cosOp;
GF_alpha1 = fft(gt_alpha1,1024);
close all

%Plotting time-domain representation of raised cosine filters
figure;
plot(-fs:1/fs:fs,gt_alpha0,'b','LineWidth', 1.5);
hold on
plot(-fs:1/fs:fs,gt_alpha5,'m','LineWidth', 1.5);
plot(-fs:1/fs:fs,gt_alpha1, 'c','LineWidth', 1.5);
legend('alpha = 0','alpha = 0.5','alpha = 1');
grid on
xlabel('Time t'); ylabel('Amplitude g(t)');
title('Time Domain Waveform of Raised Cosine Pulse Shaping Filters');
```

```
%Plotting frequency-domain representation of raised cosine filters
figure;
plot((-512:511)/1024*fs, abs(fftshift(GF_alpha0)),'b','LineWidth',1.5);
hold on
plot((-512:511)/1024*fs, abs(fftshift(GF_alpha5)),'m','LineWidth',1.5);
plot((-512:511)/1024*fs, abs(fftshift(GF_alpha1)),'c','LineWidth',1.5);
legend('alpha = 0','alpha = 0.5','alpha = 1');
axis([-2 2 0 14])
grid on
xlabel('Frequency f'); ylabel('Amplitude |G(f)|');
title('Frequency Domain Representation of Raised Cosine Pulse Shaping Filters');

alpha=0.5;
cosNum=cos(alpha*pi*[-fs:1/fs:fs]);
cosDen=(1-(2*alpha*[-fs:1/fs:fs]).^2);
cosDenZero=find(abs(cosDen)<10^-10);
cosOp=cosNum./cosDen;
cosOp(cosDenZero)=pi/4;
gt_alpha5=sincOp.*cosOp;
GF_alpha5=fft(gt_alpha5,1024);

alpha=1;
cosNum=cos(alpha*pi*[-fs:1/fs:fs]);
cosDen=(1-(2*alpha*[-fs:1/fs:fs]).^2);
cosDenZero=find(abs(cosDen)<10^-10);
cosOp=cosNum./cosDen;
cosOp(cosDenZero)=pi/4;
gt_alpha1=sincOp.*cosOp;
GF_alpha1=fft(gt_alpha1,1024);

close all;
figure;
plot([-fs:1/fs:fs],[gt_alpha0],'b','LineWidth',2);
hold on;
plot([-fs:1/fs:fs],[gt_alpha5],'m','LineWidth',2);
plot([-fs:1/fs:fs],[gt_alpha1],'c','LineWidth',2);
legend('alpha=0','alpha=0.5','alpha=1');
grid on;
xlabel('Time,t');
ylabel('Amplitude,g(t)');
title('Time domain waveform of raised cosine pulse shaping');

figure;
plot([-512:511]/1024*fs,abs(fftshift(GF_alpha0)),'b','LineWidth',2);
hold on;
plot([-512:511]/1024*fs,abs(fftshift(GF_alpha5)),'m','LineWidth',2);
plot([-512:511]/1024*fs,abs(fftshift(GF_alpha1)),'c','LineWidth',2);
legend('alpha=0','alpha=0.5','alpha=1');
axis([-2 2 0 14]);
grid on;
xlabel('Frequency,f');
ylabel('Amplitude,|G(f)|');
title('Frequency domain represntation of raised cosine pulse shaping filters');
```

OUTPUT:


Time Domain Waveform of Raised Cosine Pulse Shaping Filters
alpha = 0
alpha = 0.5
alpha = 1
Amplitude g(t)
Time t
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-10
-8
-6
-4
-2
0
2
4
6
8
10


Frequency Domain Representation of Raised Cosine Pulse Shaping Filters
alpha = 0
alpha = 0.5
alpha = 1
Amplitude |G(f)|
Frequency f
14
12
10
8
6
4
2
0
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2