Table of Contents

HW5

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```
%Student-Number : [9723042]
% University: Amirkabir University of Technology
```

Q 3

Clear recent data

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

Initialization

```
clear;
clc;
Rs = 19.2e3 ; %Symbol Rate
BTs = [0.5 , 0.2 , 0.75] ;
Ts = 1/Rs ;
B = BTs/Ts ;
alpha = 1.1774./(2*B) ;
f = -8 : 0.1 : 8 ;
f = 1e4.*f ;
t = -4 : 0.05 : 4 ;
t = 1e-4.*t ;
```

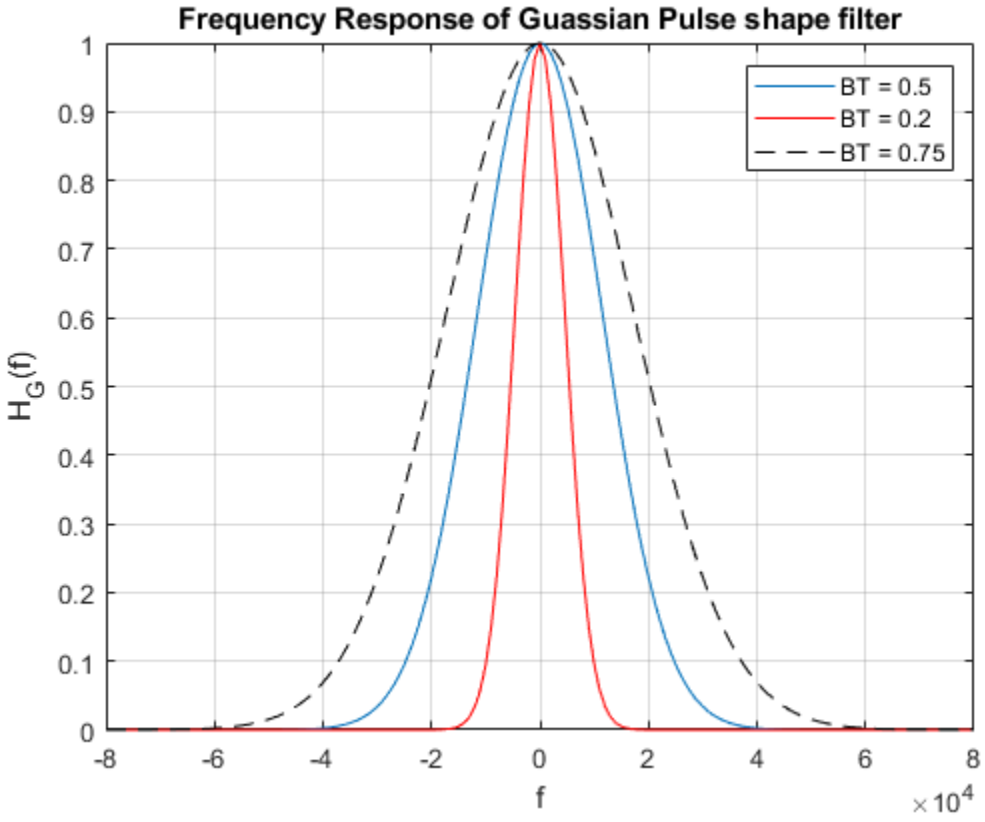
Claculation

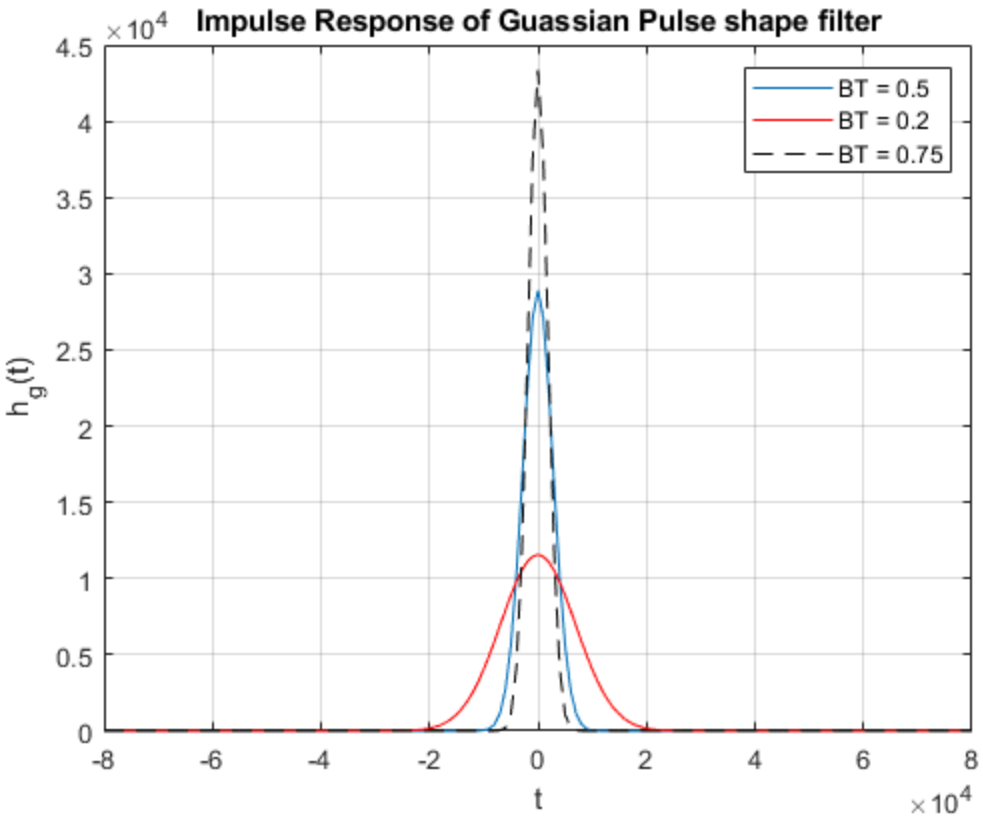
```
Hg = zeros(length(BTs),length(f));
hg = zeros(length(BTs),length(f));
for i = 1 : 3
    Hg(i,:) = exp((-alpha(i)^2).*(f.^2));
    hg(i,:) = (sqrt(pi)/alpha(i)).*(exp((-(pi^2)/
(alpha(i)^2)).*(t.^2)));
end
```

```
clc;
```

Plotting

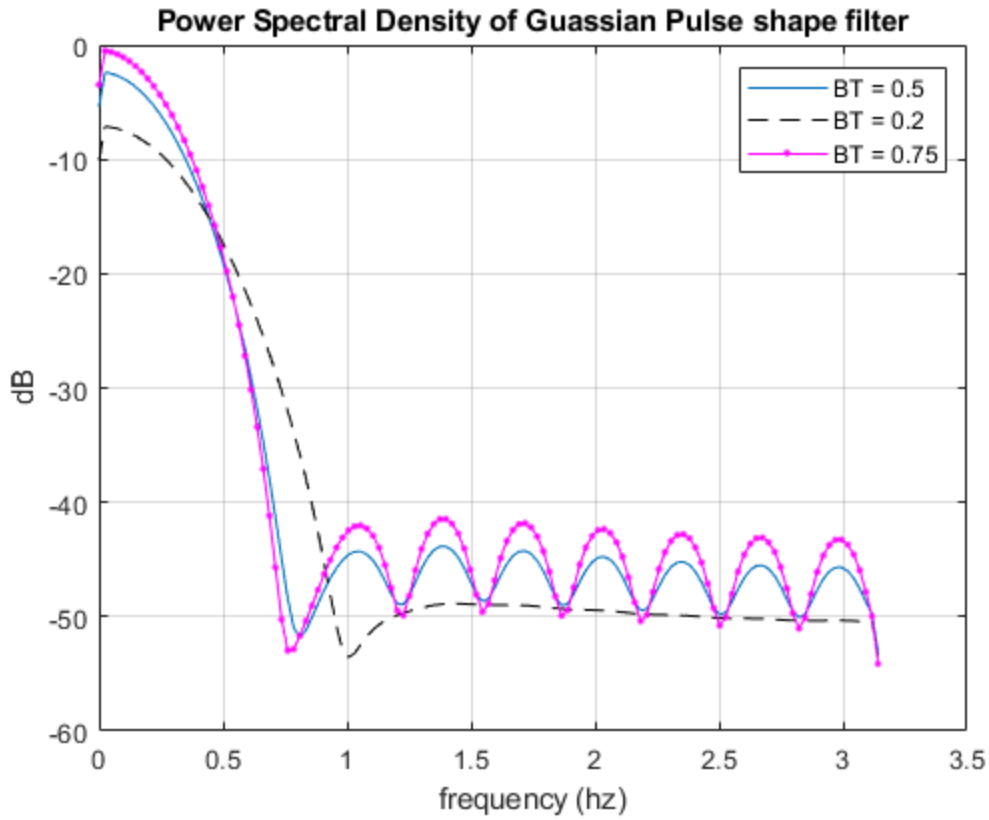
```
figure(1)
plot(f,Hg(1,:));hold on
plot(f,Hg(2,:),"-r");hold on
plot(f,Hg(3,:),"--k");hold on
title("Frequency Response of Guassian Pulse shape filter")
% axis([0 7 -1.5 1.5])
xlabel ('f')
ylabel('H_G(f)')
grid on
legend('BT = 0.5','BT = 0.2','BT = 0.75')

figure(2)
plot(f,hg(1,:));hold on
plot(f,hg(2,:),"-r");hold on
plot(f,hg(3,:),"--k");hold on
title("Impulse Response of Guassian Pulse shape filter")
% axis([0 7 -1.5 1.5])
xlabel ('t')
ylabel('h_g(t)')
grid on
legend('BT = 0.5','BT = 0.2','BT = 0.75')
```





PSD

```
clc;
figure(3)
[px , f] = pwelch(Hg(1,:),20);
plot(f,10*log10(px));hold on
[px , f] = pwelch(Hg(2,:),20);
plot(f,10*log10(px),"-- k");hold on
[px , f] = pwelch(Hg(3,:),20);
plot(f,10*log10(px),".- m");
title("Power Spectral Density of Guassian Pulse shape filter")
% axis([0 7 -1.5 1.5])
xlabel ('frequency (hz)')
ylabel('dB')
grid on
legend('BT = 0.5','BT = 0.2','BT = 0.75')
```



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