Digital Signal Processing

MATLAB HW - q3

Table of Contents

Instructor: Professor Sheikhzadeh, Author: Dina - Soltani Tehrani

E-mail: d.soltani.t@aut.ac.ir

Affiliation: Amirkabir University of Technology

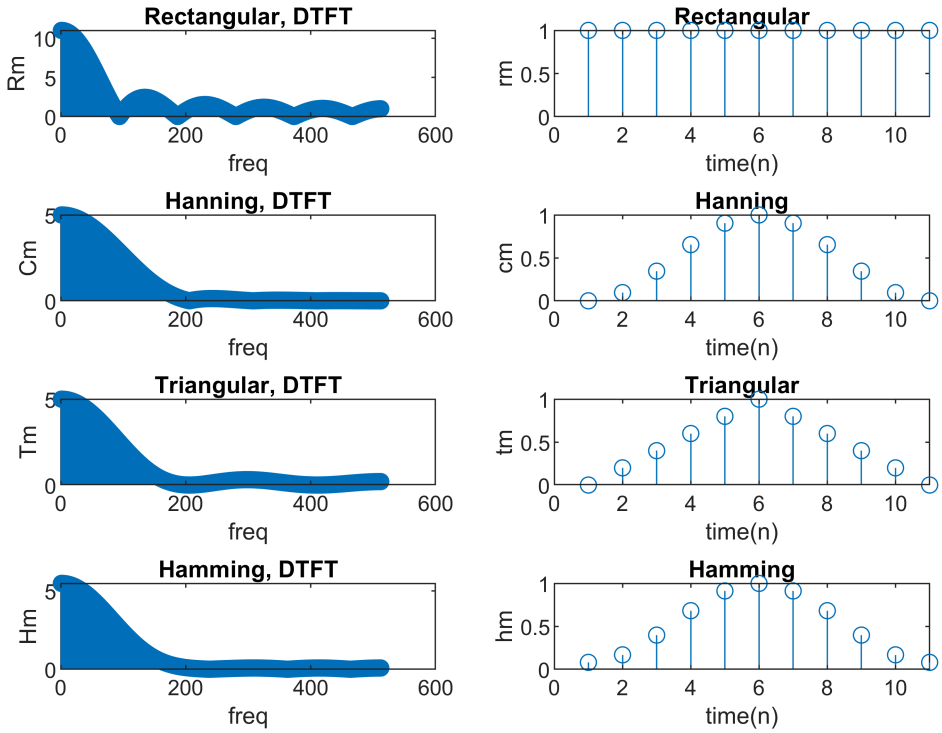
HW1-Q3

```
clc; clear; close;
M1=10; M2=50; M3=101;
M=M1;
rm= ones(1,M+1); % rectangular
cm = zeros(1,M+1); %Hanning
for ii=1:M+1
 cm(1,ii)=0.5*(1- cos( (2*pi*(ii-1))/(M) ));
end
tm = zeros(1,M+1); %Triangular
for ii=1:M+1
 tm(1,ii)=(1- ( abs(M-2*(ii-1))/(M) ));
end
hm = zeros(1,M+1); %Hamming
for ii=1:M+1
 hm(1,ii)=0.54- 0.46* (cos( (2*pi*(ii-1))/(M) ));
end
```

M=10

```
%-- M=M1
Rm= freqz(rm);
Cm= freqz(cm);
Tm= freqz(tm);
Hm= freqz(hm);
figure(10) %-- figuring
subplot(4,2,1); stem(abs(Rm))
```

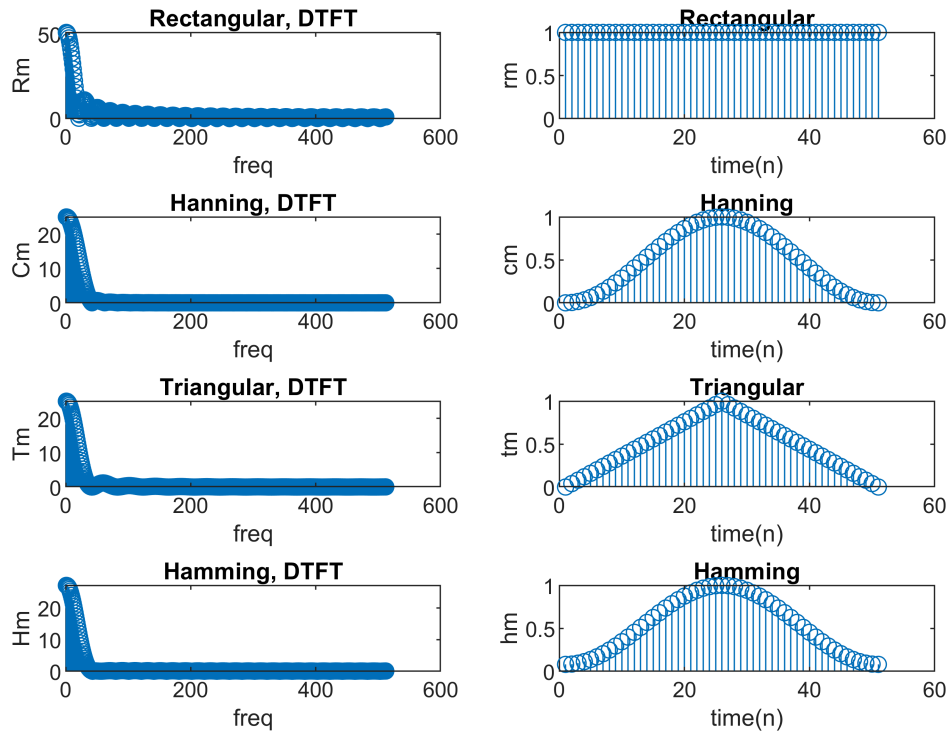
```
xlabel('freq'); ylabel('Rm'); title('Rectangular, DTFT');
subplot(4,2,3); stem(abs(Cm))
xlabel('freq'); ylabel('Cm'); title('Hanning, DTFT');
subplot(4,2,5); stem(abs(Tm))
xlabel('freq'); ylabel('Tm'); title('Triangular, DTFT');
subplot(4,2,7); stem(abs(Hm))
xlabel('freq'); ylabel('Hm'); title('Hamming, DTFT');
subplot(4,2,2); stem(rm)
xlabel('time(n)'); ylabel('rm'); title('Rectangular');
subplot(4,2,4); stem(cm)
xlabel('time(n)'); ylabel('cm'); title('Hanning');
subplot(4,2,6); stem(tm)
xlabel('time(n)'); ylabel('tm'); title('Triangular');
subplot(4,2,8); stem(hm)
xlabel('time(n)'); ylabel('hm'); title('Hamming');
```



M=50

```
%-- M=M2
M=M2;
rm= ones(1,M+1); % rectangular
cm = zeros(1,M+1); %Hanning
for ii=1:M+1
 cm(1,ii)=0.5*(1- cos( (2*pi*(ii-1))/(M) ));
end
tm = zeros(1,M+1); %Triangular
```

```
for ii=1:M+1
 tm(1,ii)=(1- ( abs(M-2*(ii-1))/(M) ));
end
hm = zeros(1,M+1); %Hamming
for ii=1:M+1
 hm(1,ii)=0.54- 0.46* (cos( (2*pi*(ii-1))/(M) ));
end
Rm= freqz(rm);
Cm= freqz(cm);
Tm= freqz(tm);
Hm= freqz(hm);
figure(11) %-- figuring
subplot(4,2,1); stem(abs(Rm))
xlabel('freq'); ylabel('Rm'); title('Rectangular, DTFT');
subplot(4,2,3); stem(abs(Cm))
xlabel('freq'); ylabel('Cm'); title('Hanning, DTFT');
subplot(4,2,5); stem(abs(Tm))
xlabel('freq'); ylabel('Tm'); title('Triangular, DTFT');
subplot(4,2,7); stem(abs(Hm))
xlabel('freq'); ylabel('Hm'); title('Hamming, DTFT');
subplot(4,2,2); stem(rm)
xlabel('time(n)'); ylabel('rm'); title('Rectangular');
subplot(4,2,4); stem(cm)
xlabel('time(n)'); ylabel('cm'); title('Hanning');
subplot(4,2,6); stem(tm)
xlabel('time(n)'); ylabel('tm'); title('Triangular');
subplot(4,2,8); stem(hm)
xlabel('time(n)'); ylabel('hm'); title('Hamming');
```



M=101

```
%-- M=M3
M=M3;
rm= ones(1,M+1); % rectangular
cm = zeros(1,M+1); %Hanning
for ii=1:M+1
 cm(1,ii)=0.5*(1- cos( (2*pi*(ii-1))/(M) ));
end
tm = zeros(1,M+1); %Triangular
for ii=1:M+1
 tm(1,ii)=(1- ( abs(M-2*(ii-1))/(M) ));
end
hm = zeros(1,M+1); %Hamming
for ii=1:M+1
 hm(1,ii)=0.54- 0.46* (cos( (2*pi*(ii-1))/(M) ));
end
Rm= freqz(rm);
Cm= freqz(cm);
Tm= freqz(tm);
Hm= freqz(hm);
figure(12) %-- figuring
subplot(4,2,1); stem(abs(Rm))
xlabel('freq'); ylabel('Rm'); title('Rectangular, DTFT');
```

```
subplot(4,2,3); stem(abs(Cm))
xlabel('freq'); ylabel('Cm'); title('Hanning, DTFT');
subplot(4,2,5); stem(abs(Tm))
xlabel('freq'); ylabel('Tm'); title('Triangular, DTFT');
subplot(4,2,7); stem(abs(Hm))
xlabel('freq'); ylabel('Hm'); title('Hamming, DTFT');
subplot(4,2,2); stem(rm)
xlabel('time(n)'); ylabel('rm'); title('Rectangular');
subplot(4,2,4); stem(cm)
xlabel('time(n)'); ylabel('cm'); title('Hanning');
subplot(4,2,6); stem(tm)
xlabel('time(n)'); ylabel('tm'); title('Triangular');
subplot(4,2,8); stem(hm)
xlabel('time(n)'); ylabel('hm'); title('Hamming');
```