BATCH:2

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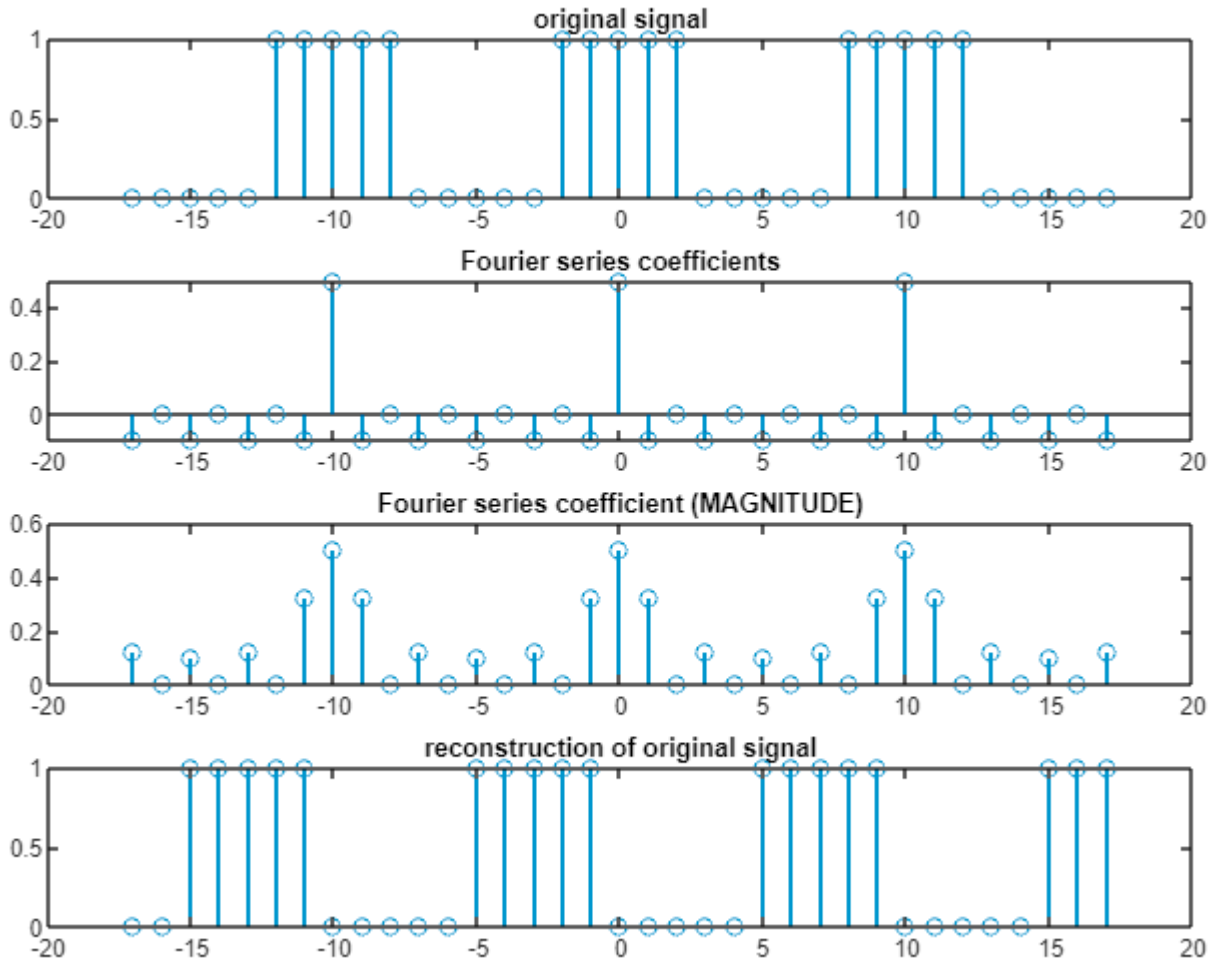
EXPERIMENT:7:Analysis and Synthesis of DT Periodic Signals Using Fourier Series.

MATLAB CODE :

```
clc;
clear all;
close all;
n=-17:17;
x=[];m=1;
for n=-17:17
    if((n<=2 && n>=-2)||(n<=-8 && n>=-12)||(n<=12 &&n>=8))
        x(m)=1;
    else
        x(m)=0;
    end
    m=m+1;
end
%original signal
subplot(411);
n=-17:17;
stem(n,x);
title('original signal');
N=10;
w=(2*pi/N);
f=[];i=1;j=sqrt(-1); k=0;y=0;
for n=-17:17
    m=1;y=0;
    for k=0:9
        ak=x(m)*exp(-1*j*w*n*k);
        y=y+ak;
        m=m+1;
    end
    f(i)=(1/N)*y;
    i=i+1;
```

```
end
n=-17:17;
%plotting fourier series coefficients
subplot(412);
stem(n,f);
title('Fourier series coefficients');
subplot(413);
stem(n,abs(f));
title('Fourier series coefficient (MAGNITUDE)');
i=1;xn=[];
for n=-17:17
    m=1;y=0;
    for k=0:9
        ak=f(m)*exp(j*w*n*k);
        y=y+ak;
        m=m+1;
    end
    xn(i)=y;
    i=i+1;
end
n=-17:17;
%reconstruction of the signal
subplot(414);
stem(n,abs(xn));
title('reconstruction of original signal');
```

MATLAB RESULT:



RESULT:

Hence the DT Periodic Square wave is been generated whose Fourier Transform is been studied and from which the original signal is been reconstructed using Matlab software.