

EE 202 - Mathematical Techniques in Electrical Engineering

LAB 4

** Find solutions of the following questions in Matlab:

Question 1:

Find the Fourier series of periodic square wave given by

$$f(x) = \begin{cases} -k & \text{if } -\pi < x < 0 \\ k & \text{if } 0 < x < \pi \end{cases}$$

```
n=1:2:5;
```

```
x=-pi:0.0001:pi;
```

```
a0=0;
```

```
an=zeros(1,length(n));
```

```
bn=(4)./(n*pi);
```

```
fx=zeros(1,length(x));
```

```
for i=1:length(n)
```

```
fx=fx+(((an(i))*(cos(n(i)*x)))+(bn(i))*(sin(n(i)*x))));
```

```
end
```

```
fx=a0+fx;
```

```
plot(x,fx)
```

Question 2:

Find the Fourier series of periodic square wave given by

$$f(x) = \begin{cases} 0 & \text{if } -2 < x < -1 \\ k & \text{if } -1 < x < 1 \\ 0 & \text{if } 1 < x < 2 \end{cases}$$

```
n=1:5;
```

```
x=-2:0.0001:2;
```

```
a0=0.5;
```

```
an=(2./(n*pi)).*(sin(n*(pi/2)));
```

```
bn=zeros(1,length(n));
```

```
fx=zeros(1,length(x));
```

```
for i=1:length(n)
```

```
fx=fx+(((an(i))*(cos(n(i)*x*(pi/2))))+((bn(i))*(sin(n(i)*x*(pi/2)))));
```

```
end
```

```
fx=a0+fx;
```

```
plot(x,fx)
```