BRAC University
Homework sheet # 6
MAT – 216

Fourier Series and application

1.(a) Determine the Fourier series for

$$f(x)=\begin{cases}-x\ , & -4\le x\le 0\\ x\ , & 0\le x\le 4\end{cases},$$

Period = 8

(b)Find the Fourier coefficients for

$$f(x)=\begin{cases}0\ , & -5<x<0\\ 3\ , & 0<x<5\end{cases}$$

Period = 10 .

2. Expand $f(x)=x\ , 0<x<2$ in a half – range

(i) Sine series (ii) Cosine series.

3. Expand $f(x)=\begin{cases}\frac{1}{4}-x\ , & 0<x<\frac{1}{2}\\ x-\frac{3}{4}\ , & \frac{1}{2}<x<1\end{cases}$, in a Fourier series of Sine terms only.

4. Graph each of the following functions and find its corresponding Fourier series, using properties of even and odd function wherever applicable.

(a) $f(x)=\begin{cases}8\ , & 0<x<2\\ -8, & 2<x<4\end{cases}$, *Period* 4

(b) $f(x)=\begin{cases}-x, & -4\le x\le 0\\ x, & 0\le x\le 4\end{cases}$, *Period* 8

(c) $f(x)=4x\ ,0<x<10$, *Period* 10

(d) $f(x)=\begin{cases}2x, & 0\le x\le 3\\ x, & -3\le x\le 4\end{cases}$, *Period* 6

5. Expand $f(x)=\cos x\ ,0<x<\pi$ in a Fourier sine series.

6. Expand $f(x)=\begin{cases}x\ , & 0<x<4\\ 8-x\ , & 4<x<8\end{cases}$ in (a) Sine series (b) Cosine series.