Engineering Mathematics II---Quiz-4s

May 3, 2006

1) $f(x)=|\cos x|,\ -\pi<x<\pi$

(a) Find the fundamental period.

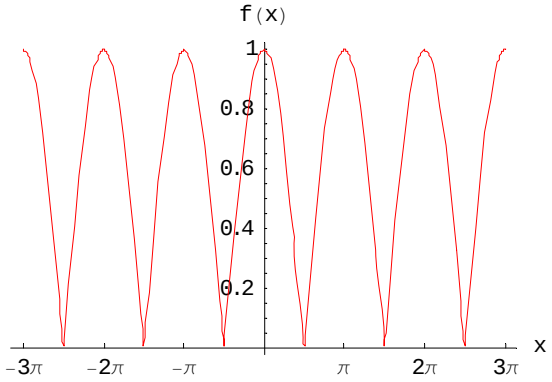
ANS $T=\pi$

(b) Find the Fourier series of $f(x)$.

ANS $a_0=\frac{4}{\pi}\int_0^{\frac{\pi}{2}}\cos x dx=\frac{4}{\pi}$

$$a_n=\frac{4}{\pi}\int_0^{\frac{\pi}{2}}\cos x\cos 2nx dx=\frac{4\cos n\pi}{\pi(1-4n^2)}=\frac{4\cdot(-1)^n}{\pi(1-4n^2)}$$

$$f(x)=\frac{2}{\pi}+\sum_{n=1}^{\infty}\frac{4\cdot(-1)^n}{\pi(1-4n^2)}\cos 2nx$$



2) $f(x)=1,\ 0<x<\pi$

(a) Find the fundamental period (for Fourier sine series).

ANS $T=2\pi$

(b) Find the Fourier sine series of $f(x)$.

ANS $b_n=\frac{2}{\pi}\int_0^{\pi}1\cdot\sin nx dx=\frac{2[1-(-1)^n]}{n\pi}$

$$f(x)=\sum_{n=1}^{\infty}\frac{2[1-(-1)^n]}{n\pi}\sin nx$$