VIT Vidyalankar Institute of Technology
Accredited A+ by NAAC

EM-III- Tutorial-3 (CMPN)

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Module-3- Fourier Series- (Radian Form)

Fourier Series **(University Que. Paper Weightage 20 Marks)**

1. Find Fourier series for the function $f(x)=\begin{cases}1+\frac{2x}{\pi} & -\pi\le x\le 0\\ 1-\frac{2x}{\pi} & 0\le x\le\pi\end{cases}$ And hence prove that $\frac{1}{1^2}+\frac{1}{3^2}+\frac{1}{5^2}+\frac{1}{7^2}+\ldots\ldots\ldots=\frac{\pi^2}{8}$ **(Dec-11,12,15,18-May -10)**

2. Find Fourier series for the function $f(x)=\begin{cases}x+\frac{\pi}{2} & -\pi<x<0\\ \frac{\pi}{2}-x & 0<x<\pi\end{cases}$ and hence prove that $\frac{1}{1^4}+\frac{1}{3^4}+\frac{1}{5^4}+\cdots=\frac{\pi^4}{96}$ **(Dec-08,09,1516,18-May -12)**

3. Find Fourier series for the function $f(x)=\sqrt{1-\cos x}$ in $(0,2\pi)$ Hence deduce that $\frac{1}{2}=\sum_{n=1}^{\infty}\frac{1}{4n^2-1}$ **(Dec-13,15,16-May -13)**

4. Find Fourier series for the function $f(x)=x^2+x$ in $[0,2\pi]$ with $f(x+2\pi)=f(x)$ **(Dec-08,11-May -10)**

5. Obtain Fourier series for $f(x)=e^x$ in $(0,2\pi)$ **(May -10, 13)**

6. Obtain Fourier series for $f(x)=xsinx,$ in $(-\pi,\pi)$ **(May-13)**