King Fahd University of Petroleum & Minerals
Department of Mathematics and Statistics

Semester II, 2012/2013 (122)
Math 513.02, Dr. Rajai S. Alassar
Homework Assignment No. 1

1. Find the Fourier series of $f(x)=\begin{cases}2x-2 & for\ -\pi \le x \le 1\\ 3 & for\ 1<x\le \pi\end{cases}$. Graph the function and the N^{th} partial sums for $N=1,5,and\ 10$.
2. Find the Fourier sine series of $f(x)=e^{-x},\ 0\le x\le 1$. Write the series in both the cosine and sine phase angle form.
3. Find the Fourier cosine series of $f(x)=\sin x,\ 0\le x\le \pi$ and use it to evaluate the sum $\sum_{n=1}^{\infty}\frac{(-1)^n}{4n^2-1}$.
4. Find the complex Fourier series of $f(t)=\begin{cases}0 & if\ -\pi<t<0\\ 1 & if\ 0<t<\pi\end{cases}$. Plot the amplitude spectrum.
5. Solve the equation $y''+y=f(t),\quad f(t)=\begin{cases}1 & if\ 0<t<\pi\\ 0 & if\ \pi<t<2\pi\end{cases};\ f(t)=f(t+2\pi)$.