

QUIZ 1 385 FALL 2004

Problem 1. Find a Fourier series for the function $f(x) = x^2$ where $0 < x < \pi$.

Problem 2. Given a function $f(x) = \frac{1-\cos(x)}{x}$ for $0 \leq x \leq \pi$. Consider the even extension of this function on the interval $[-\pi, \pi]$. Find all points on the segment $[-\pi, \pi]$ such that the Fourier series associated with this function converges. What values does the Fourier series associated with this function converges?

Problem 3. Function $f(x)$ given by the Fourier series

$$f(x) = \sum_{n=1}^{\infty} \frac{\sin(nx)}{n^{100}} \quad -\pi < x < \pi$$

Find all points where $f''(x)$ exists and compute $f''(x)$.

Problem 4. Find the Fourier series for the function

$$f(x) = \begin{cases} 1 & \text{for } x \in [0, 1] \\ 0 & \text{for } x \in [-1, 0] \end{cases}$$