

Math 333 Homework Problems #5

APPLIED PARTIAL DIFFERENTIAL EQUATIONS ... (4TH EDITION), by R. Haberman

3. FOURIER SERIES

3.2. *Statement of convergence theorem*

For the following problems, change “sketch the Fourier series” to “determine the Fourier series”.

- 3.2.1bdg, [3.2.1g](#), 3.2.2bdf, [3.2.2e](#)

3.3. *Fourier cosine and sine series*

For the following problems, change “sketch the Fourier” to “determine the Fourier”.

- 3.3.1e, 3.3.10
- [3.3.19](#) Consider

$$f(x) = \begin{cases} 0, & 0 \leq x \leq L/2 \\ 1, & L/2 < x \leq L. \end{cases}$$

Let $f_e(x)$ denote the even extension of $f(x)$ to the interval $[-L, L]$, and let $f_o(x)$ denote the odd extension of $f(x)$ to the interval $[-L, L]$. Determine the Fourier series for $f_e(x)$, say $F_e(x)$, and the Fourier series for $f_o(x)$, say $F_o(x)$. Does $F_e(\pm L) = f_e(\pm L)$? Does $F_o(\pm L) = f_o(\pm L)$? Does $F_o(0) = f_o(0)$?