

Math 309 Quiz 4

May 13, 2016

Problem 1. Let $f(x)$ be a $2L$ -periodic function. Write down the Euler-Fourier formulas for the coefficients a_n and b_n in the Fourier series of $f(x)$:

$$f(x) = \frac{a_0}{2} + \sum_{n=1}^{\infty} [a_n \cos(n\pi x/L) + b_n \sin(n\pi x/L)]$$

Problem 2. Determine the Fourier series of the function

$$f(x) = x, \quad 2 \leq x \leq 4, \quad \text{with } f(x+4) = f(x) \text{ for all } x$$

Problem 3. Write down the partial differential equation that we call the one-dimensional heat equation, and explain what solutions to the heat equation physically describe.