

Dr. Z.'s Calc5 Homework assignment 10

1: Find the complex Fourier series $f(x) = x$ on the interval $-\pi < x < \pi$.

2: Find the complex Fourier series $f(x) = x$ on the interval $-2\pi < x < 2\pi$.

3: Find the complex Fourier series $f(x) = x^3$ on the interval $-\pi < x < \pi$. (Hint: You may use

$$\int e^{cx} x^3 dx = -6 \frac{e^{cx}}{c^4} + 6 \frac{e^{cx} x}{c^3} - 3 \frac{e^{cx} x^2}{c^2} + \frac{e^{cx} x^3}{c}$$

)

4: Find the complex Fourier series $f(x) = x^3$ on the interval $-4\pi < x < 4\pi$.

5. Find the complex Fourier series $f(x)$ on the interval $-\pi < x < \pi$ where

$$f(x) = \begin{cases} 0, & \text{if } -\pi < x < 0; \\ 1, & \text{if } 0 \leq x < \pi. \end{cases}$$

1': Find the Frequency Spectrum of **1.**

2': Find the Frequency Spectrum of **2.**

3': Find the Frequency Spectrum of **3.**

4': Find the Frequency Spectrum of **4.**

5': Find the Frequency Spectrum of **5.**