1 Syllabus and Schedule

Find the course syllabus and schedule on Canvas. Read through them carefully and bring your questions to the second day of class.

2 Compare Fourier Series to Particle-in-a-Box

None Consider the function:

$$f(x) = \begin{cases} 0 & 0 < x < \frac{L}{3} \\ D & \frac{L}{3} < x < \frac{2L}{3} \\ 0 & \frac{2L}{3} < x < L \end{cases}$$

(a) You can think of this function as periodic, with period L. Expand this function in a Fourier series.

Plot an approximation containing eight nonzero terms.

Make a histogram of your coefficients. Be thoughtful about the horizontal axis of your histogram.

(b) **Extra Credit Challenge** You can also think of this function as representing a quantum particle in a box of size L. Expand this function in quantum particle in a box energy eigenstates.

Plot an approximation containing eight nonzero terms.

Make a histogram of your coefficients. Be thoughtful about the horizontal axis of your histogram.

(c) **Extra Credit Challenge:** Briefly reflect on the similarities and differences between the previous two cases. You may find it interesting to plot your approximations from $x = -2L$ to $x = 2L$