

HW #6

Please, write clearly and justify all your steps, to get proper credit for your work.

(1) This problem expands the discussion in class about alternative ways to represent a function on an interval.

Let $f(x) = x$ for $x \in [0, \pi]$

(a) Compute the Fourier series of $f(x)$ valid in the interval $[-\pi, \pi]$ and discuss its convergence properties.

(b) Compute the sine series of $f(x)$ valid in the interval $[-\pi, \pi]$ and discuss its convergence properties.

(c) Compute the cosine series of $f(x)$ valid in the interval $[-\pi, \pi]$ and discuss its convergence properties.

(2) Let $f(x) = \cos x$, $x \in [0, \pi]$

(a) Compute the cosine series of f valid in the interval $[-\pi, \pi]$

(b) Without computing the exact value of the coefficients, set up the formula and the computation of the coefficients needed to find the sine series of f valid in the interval $[-\pi, \pi]$

(3) Let $f(x) = \cos^2 x$, $x \in [-\pi, \pi]$ Compute the Fourier series of $f(x)$ valid in the interval $[-\pi, \pi]$ and discuss its convergence properties.

(4) Solve problems 4, 20, 23 (a)-(d) p.83-85