

CHAPTER 10

10.1

생략

10.2

생략

10.3

$$\frac{f_0(x)}{\sqrt{2\pi}} = \frac{1}{\sqrt{2\pi}}, \quad \frac{f_1(x)}{\sqrt{\pi}} = \frac{\cos x}{\sqrt{\pi}}, \quad \frac{f_2(x)}{\sqrt{\pi}} = \frac{\cos 2x}{\sqrt{\pi}}, \quad \dots, \quad \frac{f_n(x)}{\sqrt{\pi}} = \frac{\cos nx}{\sqrt{\pi}}$$

10.4

$$f(x) = \sum_{n=1}^{\infty} \frac{4(1 - \cos n\pi)}{n\pi} \sin nx$$

10.5

$$f(x) = \frac{\pi}{4} + \sum_{n=1}^{\infty} \left(\frac{1 - \cos n\pi}{\pi n^2} \cos nx - \frac{1}{n} \sin nx \right)$$

10.6

$$f(x) = \frac{1}{\pi} + \sum_{n=1}^{\infty} \left[\frac{2(-1)^{n+1}}{\pi(4n^2 - 1)} \cos 2nx + \frac{4n}{\pi(4n^2 - 1)} \sin 2nx \right]$$

10.7

$$f(x) = \frac{\pi}{4} + \sum_{n=1}^{\infty} \left[\frac{3(1 - \cos n\pi)}{\pi n^2} \cos nx + \frac{1}{n} \cos n\pi \sin nx \right]$$

10.8

$$(a) \quad f(x) = -\frac{1}{2} + \sum_{n=1}^{\infty} \left(-\frac{2}{n\pi} \sin \frac{n\pi}{2} \cos \frac{n\pi}{2} x \right)$$

$$(b) \quad f(x) = \sum_{n=1}^{\infty} \left(-\frac{4}{n\pi} \sin \frac{n\pi}{2} \cos \frac{n\pi}{2} x \right)$$

$$(c) \quad f(x) = \frac{\pi}{2} + \sum_{n=1}^{\infty} \frac{2}{\pi n^2} (1 - \cos n\pi) \cos nx$$

$$(d) \quad f(x) = \frac{\pi}{2} + \sum_{n=1}^{\infty} \frac{2}{\pi n^2} [(-1)^n - 1] \cos nx$$

10.9

$$(a) \quad f(x) = \sum_{n=1}^{\infty} \frac{2}{n\pi} (1 - \cos n\pi) \sin \frac{n\pi}{2} x$$

$$(b) \quad f(x) = \sum_{n=1}^{\infty} \left[\frac{2}{n} (-1)^n \right] \sin nx$$

$$(c) \quad f(x) = \sum_{n=1}^{\infty} \left[\frac{2\pi^2}{n} (-1)^{n+1} + \frac{12}{n^3} (-1)^n \right] \sin nx$$

10.10

$$(a) \quad f(x) = \frac{1}{2} - \sum_{n=1}^{\infty} \frac{2}{n\pi} \sin \frac{n\pi}{2} \cos \frac{n\pi}{2} x$$

$$(b) \quad f(x) = \frac{1}{2} + \sum_{n=1}^{\infty} \frac{2}{(n\pi)^2} (\cos n\pi - 1) \cos n\pi x$$

10.11

$$(a) \quad f(x) = \sum_{n=-\infty}^{\infty} \frac{i}{n\pi} (1 - \cos n\pi) e^{in\pi x}$$

$$(b) \quad f(x) = \sinh(1) \sum_{n=-\infty}^{\infty} \frac{1 + in\pi}{1 + (n\pi)^2} (-1)^n e^{in\pi x}$$

10.12

$$f(x) = \frac{1}{\pi} \int_0^{\infty} \left[\frac{\sin(\omega x - \omega) - \sin \omega x}{\omega} \right] d\omega$$

10.13

$$f(x) = \int_0^{\infty} A(\omega) \cos \omega x \, d\omega$$

10.14

$$f(x) = \int_0^{\infty} B(w) \sin wx \, dw$$

10.15

$$(a) \quad \hat{f}(w) = \frac{c}{iw} (1 - e^{-2wi})$$

$$(b) \quad \hat{f}(w) = 2c \frac{\sin a\omega}{\omega}$$

$$(c) \quad \hat{f}(\omega) = \frac{1}{2 + i\omega}$$

$$(d) \quad \hat{f}(w) = \frac{1}{1 + \omega^2}$$