

CHAPTER 11

11.1

- (a) 포물형
- (b) 쌍곡형
- (c) 타원형

11.2

생략

11.3

- (a) $u(x, y) = c_1(y) \cos x + c_2(y) \sin x$
- (b) $u(x, y) = e^y \int f(x) dx + g(y)$
- (c) $u(x, y) = Ae^{\alpha(2x+y)}$
- (d) $u(x, y) = Ae^{\alpha x} e^{\frac{1}{2}(1-\alpha)y}$

11.4

- (a) $u(x, t) = \sum_{n=1}^{\infty} A_n \cos \frac{cn\pi}{L} t \sin \frac{n\pi}{L} x$
- (b) $u(x, t) = \sum_{n=1}^{\infty} \left[2 \left(\frac{L}{n\pi} \right)^2 \sin \frac{n\pi}{2} \cos \frac{cn\pi}{L} t \right] \sin \frac{n\pi}{L} x$
- (c) $u(x, t) = \frac{0.1}{c} \sin 2ct \sin 2x$

11.5

- (a) $u(x, t) = \sum_{n=1}^{\infty} \frac{2}{n\pi} \left(1 - \cos \frac{n\pi}{2} \right) \sin \frac{n\pi}{L} x e^{-\left(\frac{cn\pi}{L} \right)^2 t}$
- (b) $u(x, t) = \sum_{n=1}^{\infty} \left(-\frac{L^2}{n\pi} \cos n\pi \right) \sin \frac{n\pi}{L} x e^{-\left(\frac{cn\pi}{L} \right)^2 t}$
- (c) $u(x, t) = \sum_{n=1}^{\infty} \frac{L^2}{n\pi} \sin \frac{n\pi}{L} x e^{-\left(\frac{cn\pi}{L} \right)^2 t}$

11.6

$$(a) \quad u(x, y) = \sum_{n=1}^{\infty} A_n \sin \frac{n\pi}{a} x \cosh \frac{n\pi}{a} y \quad (\text{여기서 } A_n = \frac{2}{a \cosh \frac{n\pi b}{a}} \int_0^a f(x) \sin \frac{n\pi}{a} x dx)$$

$$(b) \quad u(x, y) = \sum_{n=1}^{\infty} A_n \sin \frac{n\pi}{a} x \cosh \frac{n\pi}{a} y \quad (\text{여기서 } A_n = -\frac{2a}{n\pi} \frac{\cos n\pi}{\cosh(n\pi b/a)})$$

$$(c) \quad u(x, y) = \sum_{n=1}^{\infty} A_n \sin \frac{n\pi}{a} x \cosh \frac{n\pi}{a} y \quad (\text{여기서 } A_n = \frac{2a}{n\pi} \frac{1}{\cosh(n\pi b/a)})$$

11.7

$$(a) \quad v(x, t) = u(t) + t - (t-x)u(t-x)$$

$$(b) \quad v(x, t) = \frac{1}{2}t^2 - \frac{1}{2}(t-x)^2 u(t-x)$$

11.8

$$\hat{u}(\omega, t) = \frac{\hat{g}(\omega)}{c\omega} \sin c\omega t \text{의 푸리에 역변환을 구하면 된다.}$$