

## Exercise 11

In Exercises 6 through 11, use the formal method, involving an infinite series of residues and illustrated in Examples 2 and 3 in Sec. 89, to find the function  $f(t)$  that corresponds to the given function  $F(s)$ .

$$F(s) = \frac{\sinh(xs)}{s(s^2 + \omega^2) \cosh s} \quad (0 < x < 1),$$

$$\text{where } \omega > 0 \text{ and } \omega \neq \omega_n = \frac{(2n-1)\pi}{2} \quad (n = 1, 2, \dots).$$

$$\text{Ans. } f(t) = \frac{\sin \omega x \sin \omega t}{\omega^2 \cos \omega} + 2 \sum_{n=1}^{\infty} \frac{(-1)^{n+1}}{\omega_n} \cdot \frac{\sin \omega_n x \sin \omega_n t}{\omega^2 - \omega_n^2}.$$