

Exercise 8

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 $F(s)$.

$$F(s) = \frac{\coth(\pi s/2)}{s^2 + 1}.$$

$$\text{Ans. } f(t) = \frac{2}{\pi} - \frac{4}{\pi} \sum_{n=1}^{\infty} \frac{\cos 2nt}{4n^2 - 1}.*$$

*This is actually the rectified sine function $f(t) = |\sin t|$. See the authors' "Fourier Series and Boundary Value Problems," 7th ed., pp. 7–8, 2008.