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 \( F(s) \).

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

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.

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