

## Complex Variable 作業 12

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Given a casual function  $f(t) = e^{-\xi t} \cos(t), t > 0, \text{otherwise } f(t) = 0$

- (1) Please find  $f_e(t)$  and  $f_o(t)$ .
- (2) Plot  $f_e(t)$  and  $f_o(t)$ .
- (2) Please find its Fourier transform.
- (3) Check its Hilbert transform pair using complex integrals.
- (4) By taking the limit of  $\xi \rightarrow 0$ , recheck the results of the previous homeworks.

Hint:  $\lim_{k \rightarrow 0} S_k(x) = \lim_{k \rightarrow 0} \frac{1}{\pi} \frac{k}{1+k^2 x^2} = \delta(x)$