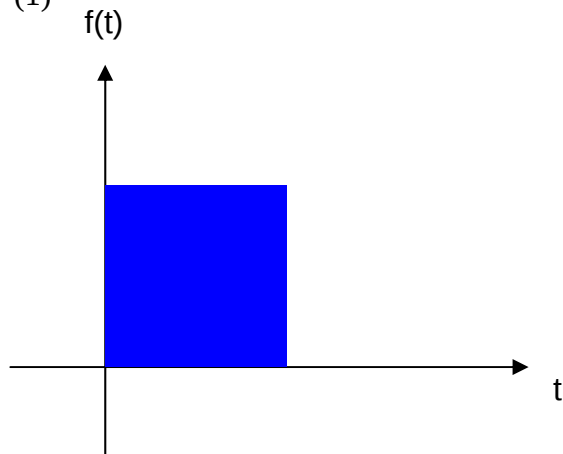


Homework 2014-06-04 工程數學(二) 2B 班 第十二次課堂小考(解答)

系級: _____ 學號: _____ 姓名: _____

請做出以下傅立葉轉換

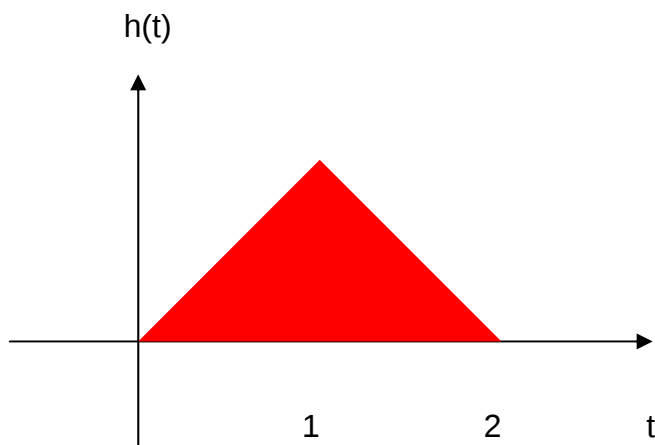
(1)



$$f(t) = \begin{cases} 1, & 0 \leq t \leq 1 \\ 0, & \text{otherwise} \end{cases}$$

$$F(\omega) = \int_0^1 f(t) e^{-i\omega t} dt = \int_0^1 e^{-i\omega t} dt = -\frac{1}{i\omega} (e^{-i\omega} - 1)$$

(2)



$$h(t) = \begin{cases} t, & 0 \leq t < 1 \\ 2-t, & 1 \leq t < 2 \\ 0, & t < 0 \text{ \& } t > 2 \end{cases}$$

$$\begin{aligned} H(\omega) &= \int_0^1 t e^{-i\omega t} dt + \int_1^2 (2-t) e^{-i\omega t} dt \\ &= \int_0^1 t e^{-i\omega t} dt + \int_1^2 (2-t) e^{-i\omega t} dt \\ &= \frac{1}{\omega^2} (2e^{-i\omega} - e^{-2i\omega} - 1) \end{aligned}$$