King Fahd University of Petroleum & Minerals

Electrical Engineering Department

EE370: Communications Engineering I (091)

Quiz 2: Fourier Transform Dr. Ali Muqaibel

-1 point for not writing your serial #

Serial #

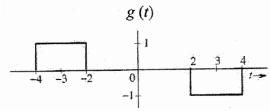
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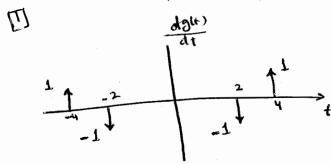
ver. 1

We would like to find the Fourier transform of g(t) using the time differentiation property.

- 1) Sketch the $\frac{dg(t)}{dt}$. Show all important values. 3
- 2) Find the Fourier transform of $\frac{dg(t)}{dt}$.
- 3) Find and simplify the Fourier transform of g(t).

Tables provided at the back of this page.





$$\frac{d0^{(t)}}{dt} = 8(t+4) - 8(t+2)$$

$$+ 8(t-4) - 8(t-2)$$

$$\begin{aligned}
\mathcal{F} \left[\frac{d g(t)}{dt} \right] &= 1 \\
\mathcal{F} \left[\delta(t) \right] &= 1 \\
\text{Using the Time shift property} \\
&= -J \omega^{4} - J \omega^{2} - J \omega^{4} - J \omega^{2} \\
e &= -e + e - e
\end{aligned}$$

Why the differentian property

$$F\left[\frac{dg(t)}{dt}\right] = j\omega G(\omega)$$

$$\Rightarrow G(\omega) = \int_{J\omega} F\left[\frac{dg(t)}{dt}\right]$$

$$= \frac{1}{J\omega} \left[e^{-J\omega^{4}} + e^{-J\omega^{2}} - e^{-J\omega^{2}}\right]$$

$$= \frac{1}{J\omega} \left[2\cos 4\omega - 2\cos 2\omega\right]$$

$$= \frac{2}{J\omega} \left[\cos 4\omega - \cos 2\omega\right]$$