

ECE 301 Quiz 6.

7/29 (Wed)

Quiz 6.

Find the DTFT of $h[n] = u[n-2] - u[n-6]$.

~~Hint~~. You may use some properties below:

$$\circ \quad u[n] - u[n-N] \xleftrightarrow{\text{DTFT}} e^{-j\frac{N-1}{2}\omega} \frac{\sin(\frac{N}{2}\omega)}{\sin(\frac{1}{2}\omega)}$$

$$\circ \quad x[n-n_0] \xleftrightarrow{\text{DTFT}} X(\omega) e^{-j\omega n_0}$$

(Answer) $u[n] - u[n-4] \xleftrightarrow{\text{DTFT}} e^{-j\frac{4-1}{2}\omega} \frac{\sin(\frac{4}{2}\omega)}{\sin(\frac{1}{2}\omega)}$

time-shift by 2 ↓

$$u[n-2] - u[n-6] \xleftrightarrow{\text{DTFT}} e^{-j\frac{4-1}{2}\omega} \frac{\sin(\frac{4}{2}\omega)}{\sin(\frac{1}{2}\omega)} e^{-j2\omega}$$