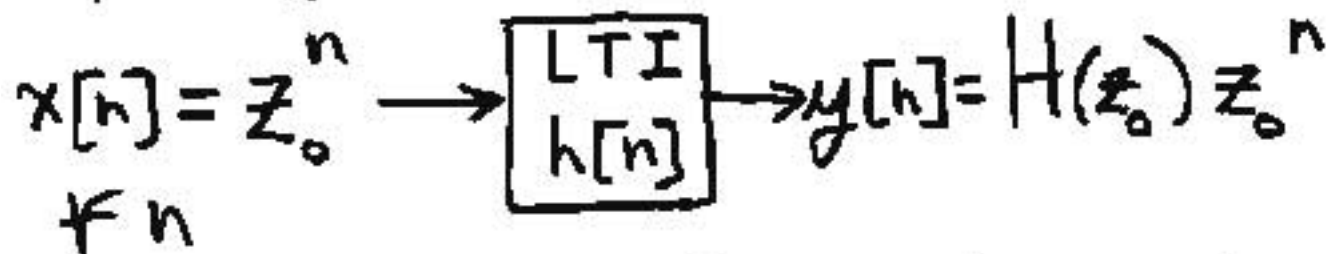


• Onto Chap. 4 on DTFT 12
Discrete-Time Fourier Transform

• Recall:

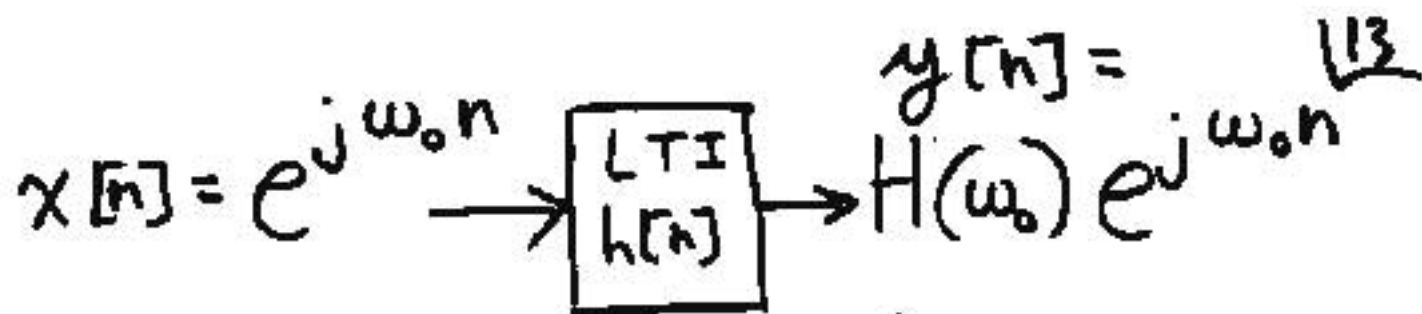


• Consider z_0 on the unit circle

• recall: $e^{j\theta} = \cos \theta + j \sin \theta$

• $z_0 = e^{j0} = 1$; $z_0 = e^{j\pi} = -1 = e^{-j\pi}$

• $z_0 = e^{j\frac{\pi}{2}} = j$; $z_0 = e^{-j\frac{\pi}{2}} = -j$



• where: $H(\omega) = H(z) \Big|_{z=e^{j\omega}}$

notational problem

• $H(\omega) = \sum_{n=-\infty}^{\infty} h[n] e^{-j\omega n}$

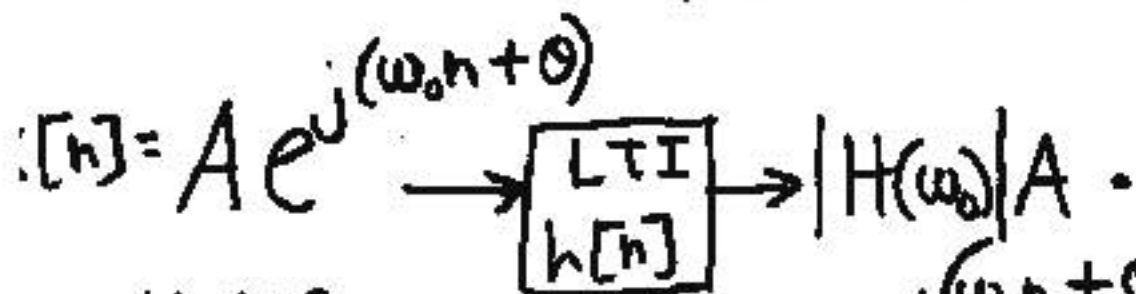
} DTFT
 of $h[n]$

- only defined if ROC includes $|z|=1$
- ⇒ only defined for stable systems

$$H(\omega_0) = |H(\omega_0)| e^{j\angle H(\omega_0)}$$

(14)

$$x[n] = A e^{j(\omega_0 n + \theta)}$$



$$-\infty < n < \infty$$

$$\times e^{j(\omega_0 n + \theta + \angle H(\omega_0))}$$

• recall:

$$\cos(\omega_0 n) = \frac{1}{2} e^{j\omega_0 n} + \frac{1}{2} e^{-j\omega_0 n}$$

$$A \cos(\omega_0 n + \theta) \rightarrow h[n] \rightarrow A |H(\omega_0)| \cdot$$

$$\times \cos(\omega_0 n + \theta + \angle H(\omega_0))$$