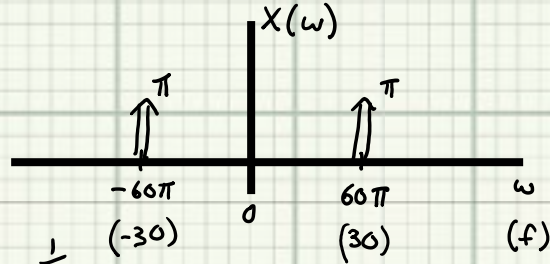


Example: Consider a 30Hz sinusoid sampled at 120Hz.

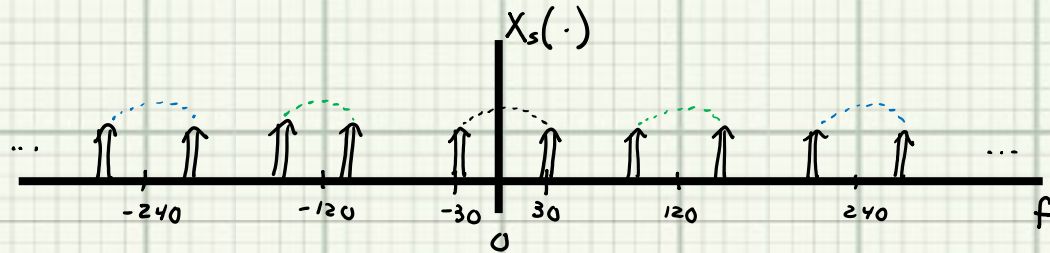
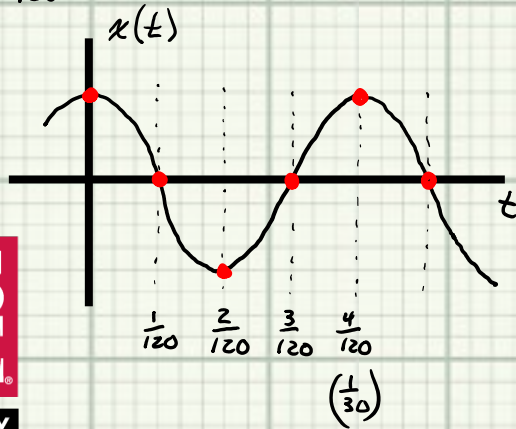
$$x(t) = \cos(2\pi 30 t)$$

$$\omega = 2\pi f = 2\pi 30 \quad T = \frac{1}{30} \text{ sec}$$

$$X(\omega) = \pi [\delta(\omega - 60\pi) + \delta(\omega + 60\pi)]$$



$$T_s = \frac{1}{f_s} = \frac{1}{120}$$



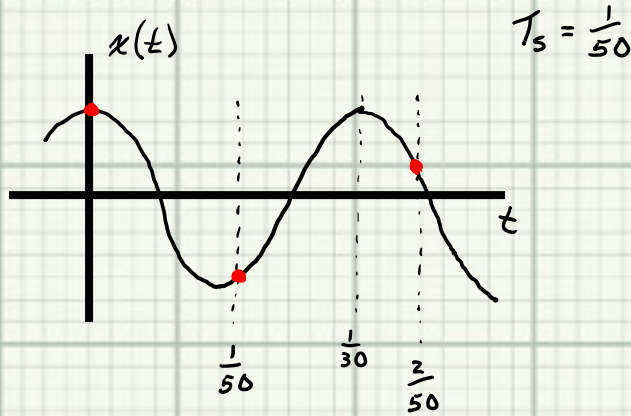
Nyquist Sampling Theorem is satisfied!

$$\omega_s > 2\omega_m$$

$$\omega_s = 2\pi 120 = 240\pi \text{ rad/s}$$

$$\omega_m = 2\pi 30 = 60\pi \text{ rad/s}$$

(continued) Now consider sampling at 50Hz.



Nyquist Theorem NOT satisfied!

$$\omega_m = 60\pi \text{ rad/s}$$

$$\omega_s = 100\pi \text{ rad/s}$$

Aliasing occurs!

