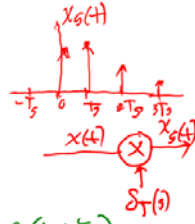
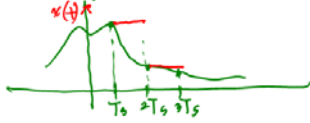


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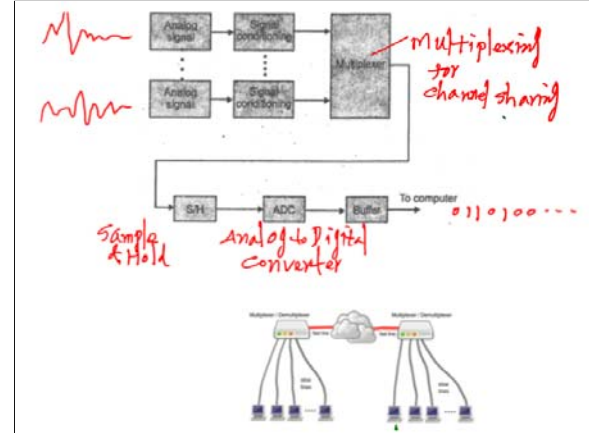
Quiz 5 return today (avg = 7.9 $\alpha = 1.5$)
Topic section 8.5 signal reconstruction

Sample & Hold



$$x_s(t) = x(t) \cdot \delta_{T_s}(t)$$

$$\delta_{T_s}(t) = \sum_{k=-\infty}^{\infty} \delta(t - kT_s)$$



$$x_s(t) \rightarrow X_s(\omega)$$

$$x(t) \cdot \delta_{T_s}(t) \xrightarrow{F} X(\omega) * \Delta(\omega)$$

$$\delta_{T_s}(t) = \sum_{k=-\infty}^{\infty} \delta(t - kT_s) = \sum_{k=-\infty}^{\infty} C_k e^{jk\omega_s t}$$

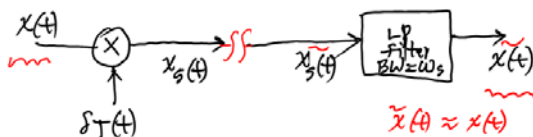
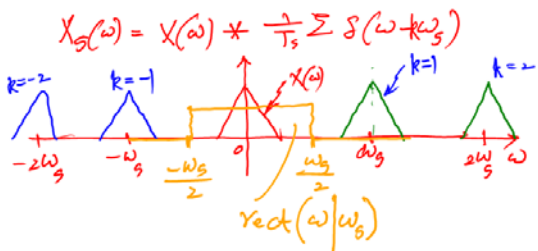
$\omega_s T_s = 2\pi$

$$C_k = \frac{1}{T_s} \int_{T_s} \delta_{T_s}(t) e^{-jk\omega_s t} dt \rightarrow C_k = \frac{1}{T_s}$$

$$\delta_{T_s}(t) = \frac{1}{T_s} \sum_{k=-\infty}^{\infty} e^{jk\omega_s t} = \sum_{k=-\infty}^{\infty} \delta(t - kT_s)$$

$\omega_s = \frac{2\pi}{T_s}$

$$\Delta(\omega) = \frac{1}{T_s} \sum_{k=-\infty}^{\infty} \delta(\omega - k\omega_s)$$



$$X_s(\omega) = X(\omega) * \Delta(\omega)$$

$$= X(\omega) * \frac{1}{T_s} \sum_{k=-\infty}^{\infty} \delta(\omega - k\omega_s)$$

$$= \frac{1}{T_s} \sum_{k=-\infty}^{\infty} X(\omega - k\omega_s)$$

$$X(\omega) * \delta(\omega - k\omega_s) = X(\omega - k\omega_s)$$

$$\int X(\omega - z) \delta(z - k\omega_s) dz = X(\omega - k\omega_s)$$

