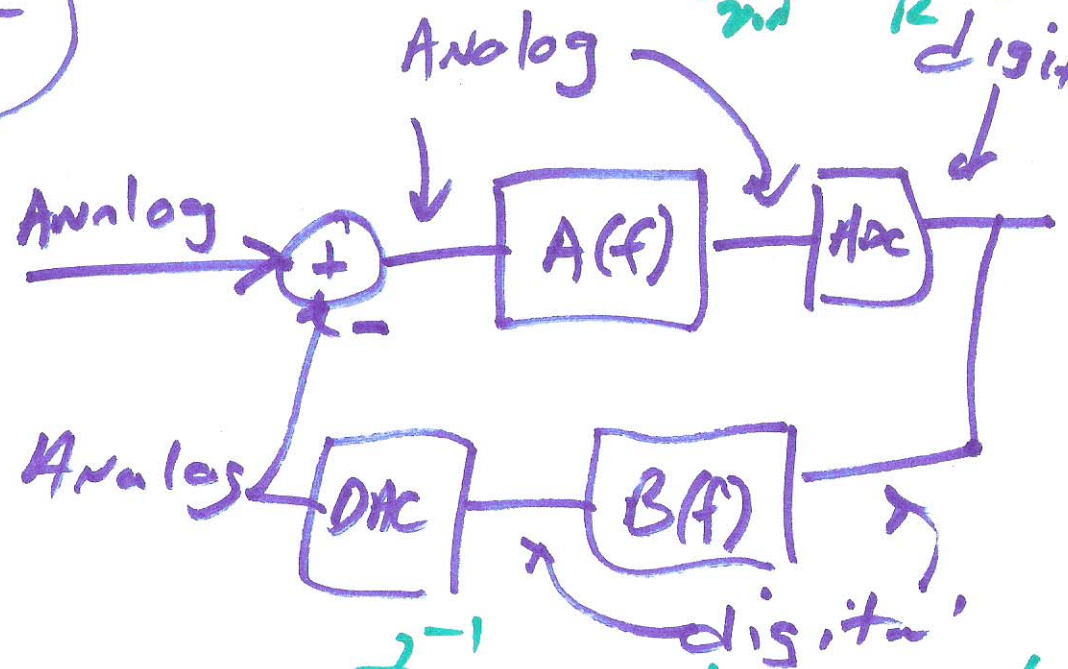
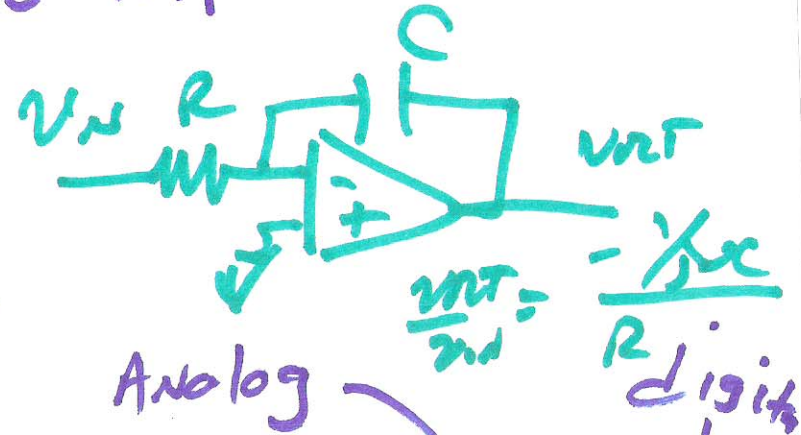
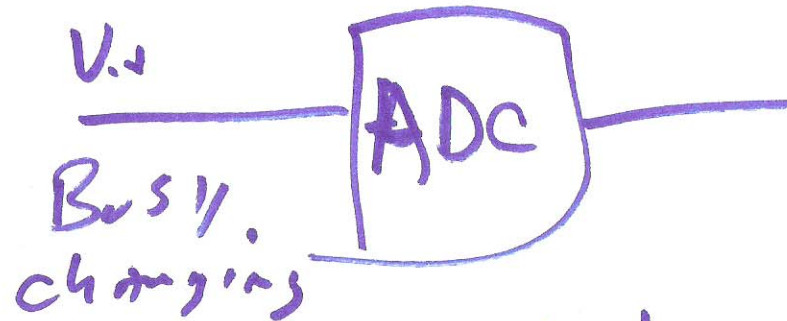


Lecture 13

OCT. 8

Using feedback to improve SNR



$\frac{1}{S}$

$$z = e^{j2\pi \frac{f}{f_s}}$$

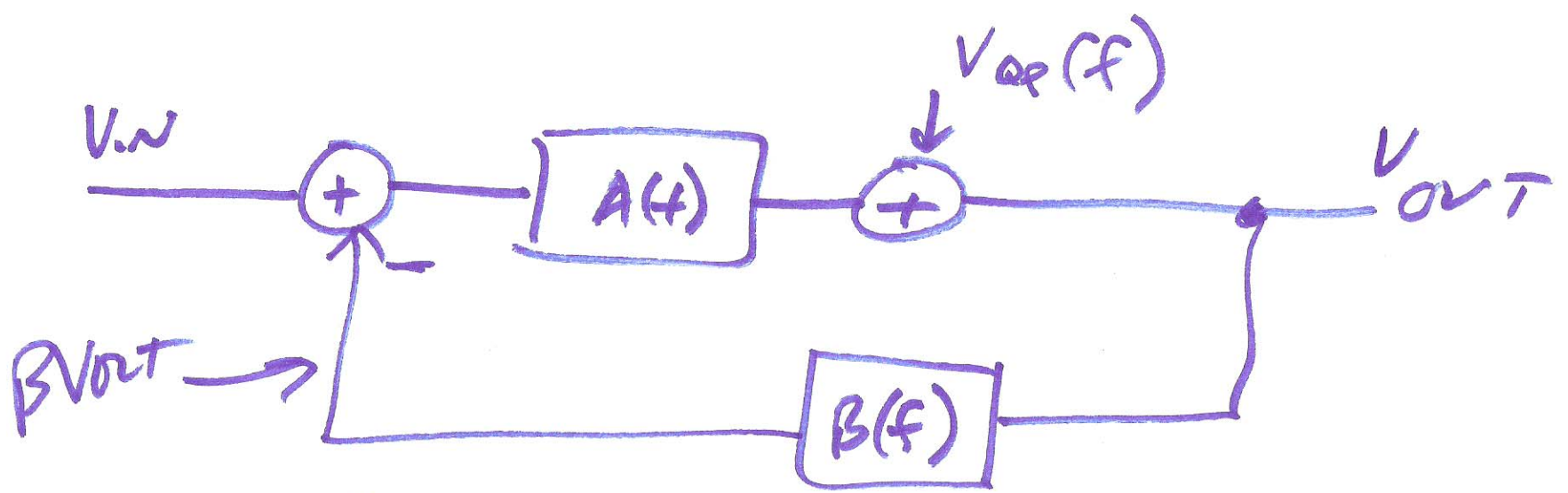
$$\approx 1 + j2\pi \frac{f}{f_s}$$

$f \ll f_s$

$$\frac{z^{-1}}{1-z^{-1}} = \frac{1}{z-1} = \frac{1}{S}$$

$S = j\omega$

1)



$$V_{INT} = (B(f) \cdot V_{OUT} + V_{IN}) A(f) + V_{de}(f)$$

$$V_{OUT} (1 + A(f) B(f)) = \frac{A(f) \cdot V_{IN} + V_{de}(f)}{1}$$

$$V_{OUT}(s) = \frac{A(s)}{1 + A(s) \cdot B(s)} V_{IN} + \frac{V_{de}(s)}{1 + A(s) B(s)}$$

A → $\frac{z^{-1}}{1-z^{-1}}$

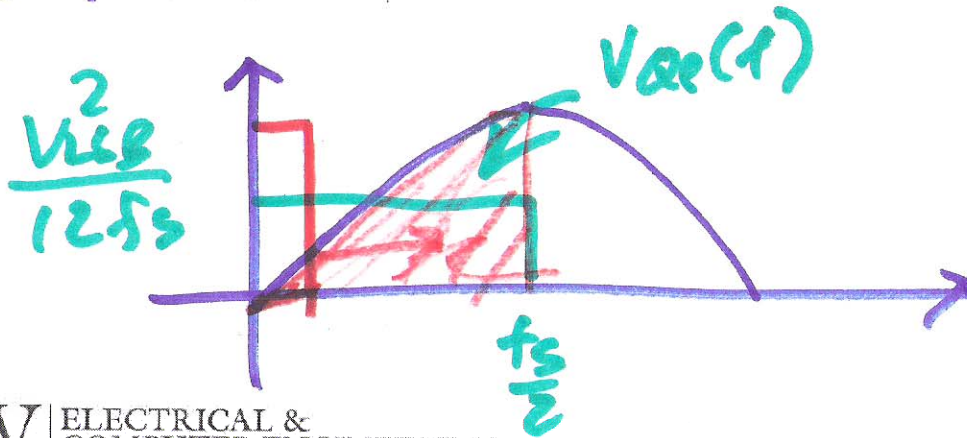
2)

$$\beta = 1 \quad A = \frac{z^{-1}}{1 - z^{-1}}$$

$$V_{OUT} = \frac{z^{-1}}{1 - z^{-1}} \cdot V_{in} + \frac{V_{oe}}{1 + \frac{z^{-1}}{1 - z^{-1}}}$$

STF

$$V_{OUT} = z^{-1} \cdot V_{IN}(t) + \underbrace{(1 - z^{-1})}_{\text{NTF}} V_{oe}(t)$$



NTF
 $1 - z^{-1}$

3)