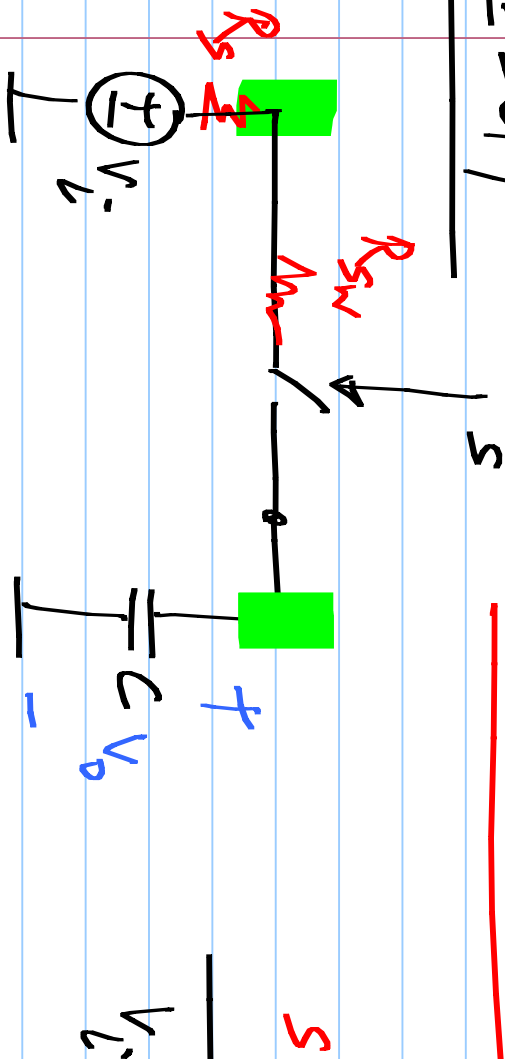


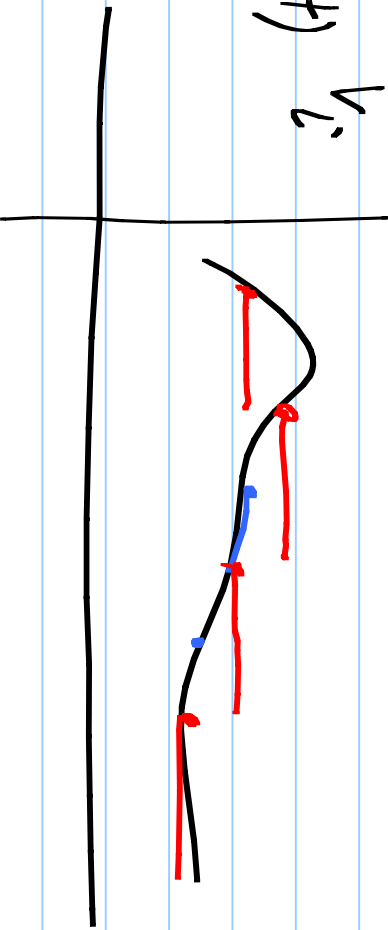
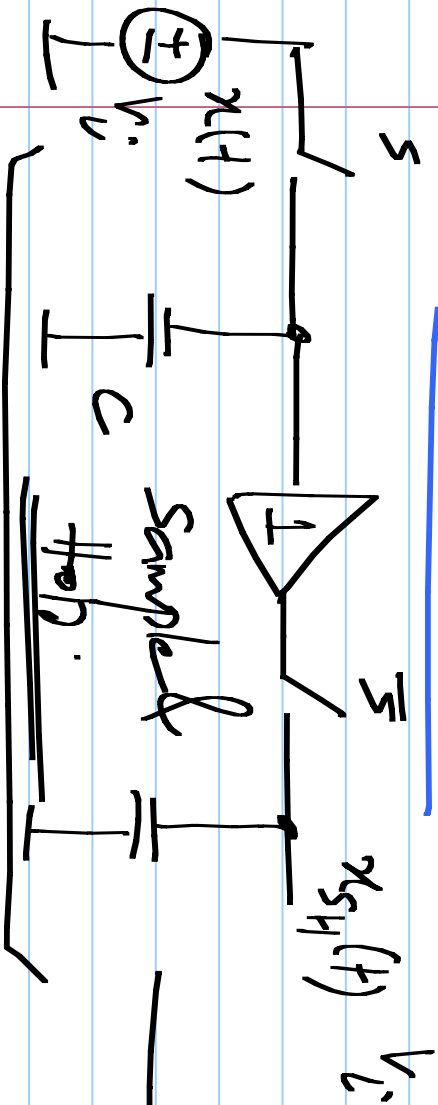
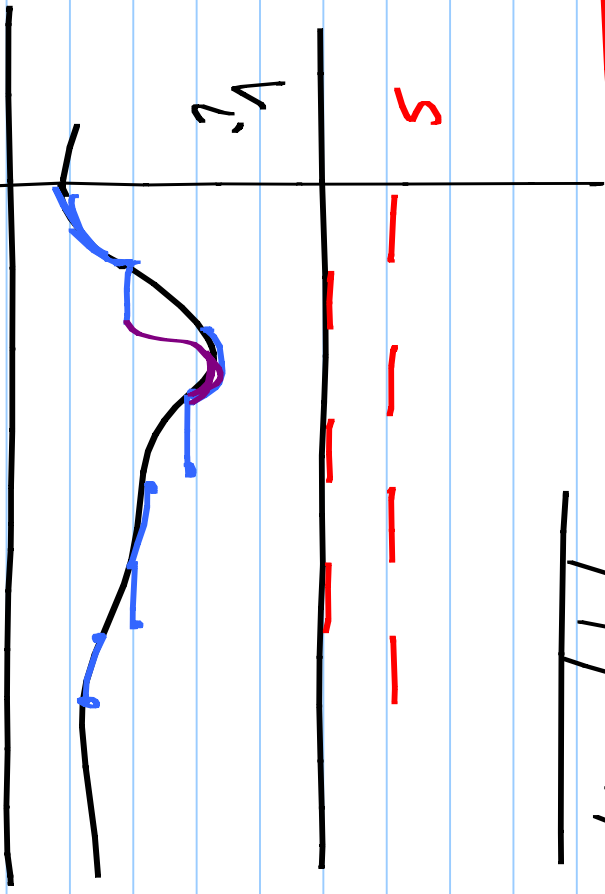
ECE 2019

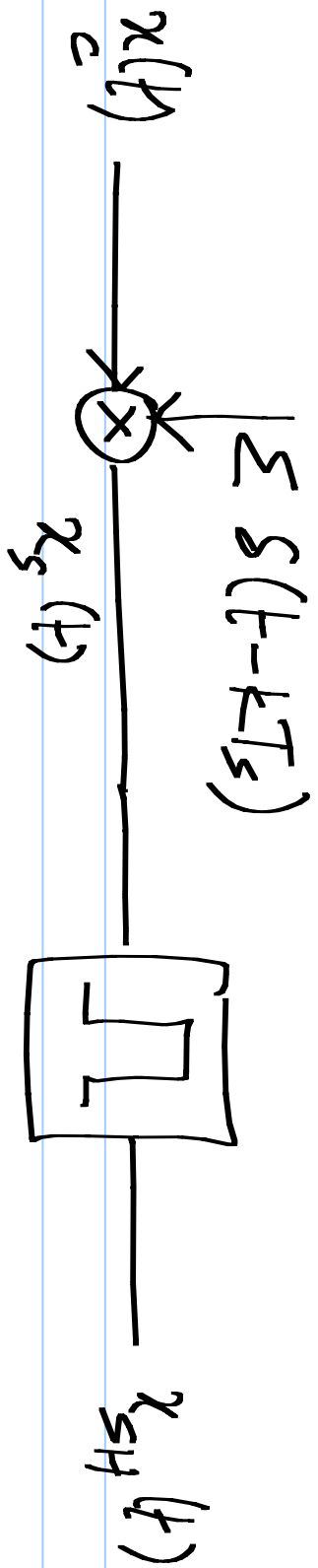
$$(R_s + R_{sw}) \cdot C \ll T_s / 2$$

12/4/2017

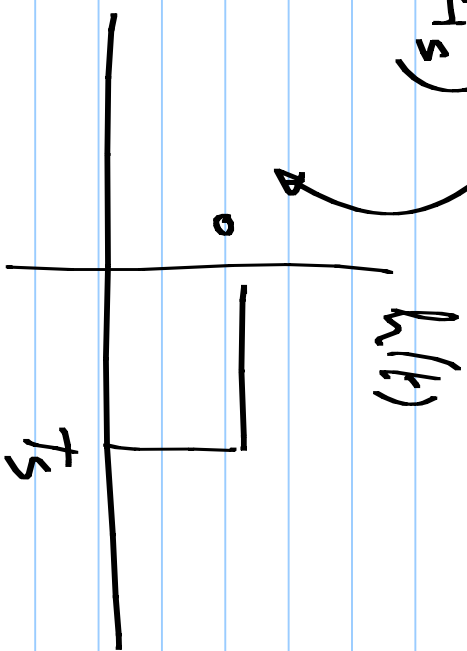
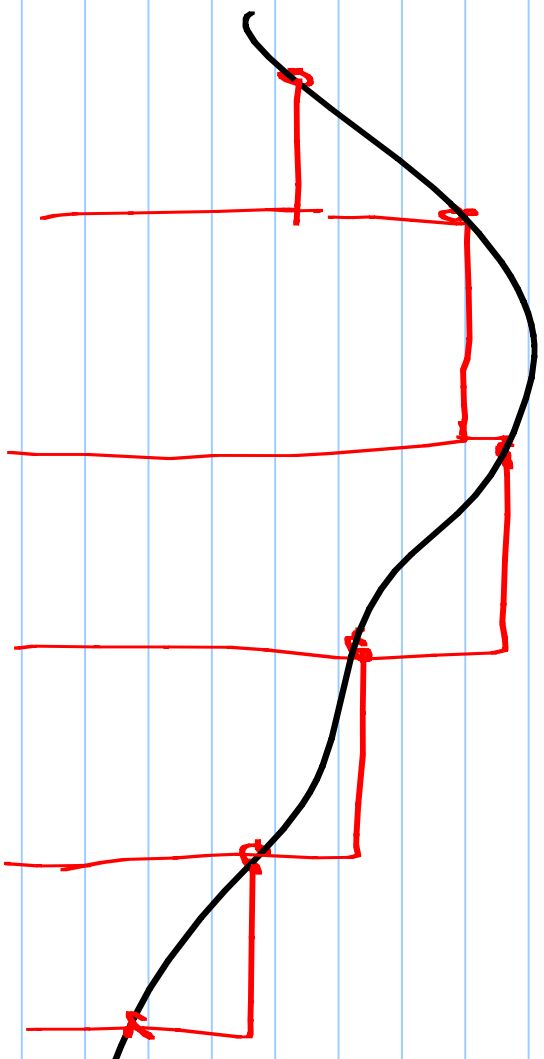


Track & hold





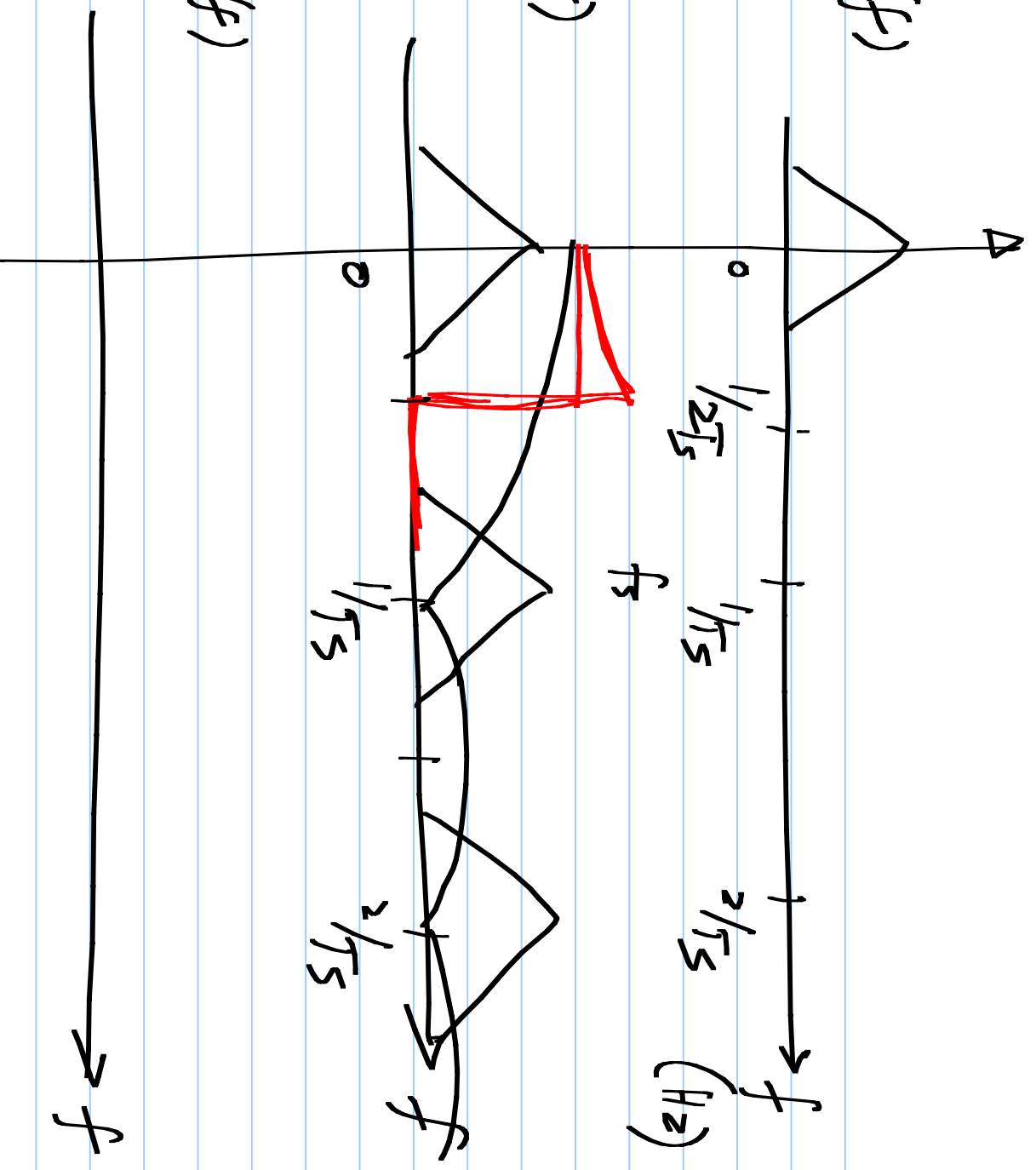
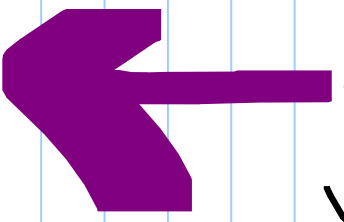
$$= \sum_k x_c(kT_s) \delta(t - kT_s)$$



$$x(t) \leftrightarrow X(f)$$

$$x_s(t) \leftrightarrow X_s(f)$$

$$x_{SA}(t) \leftrightarrow X_{SA}(f)$$





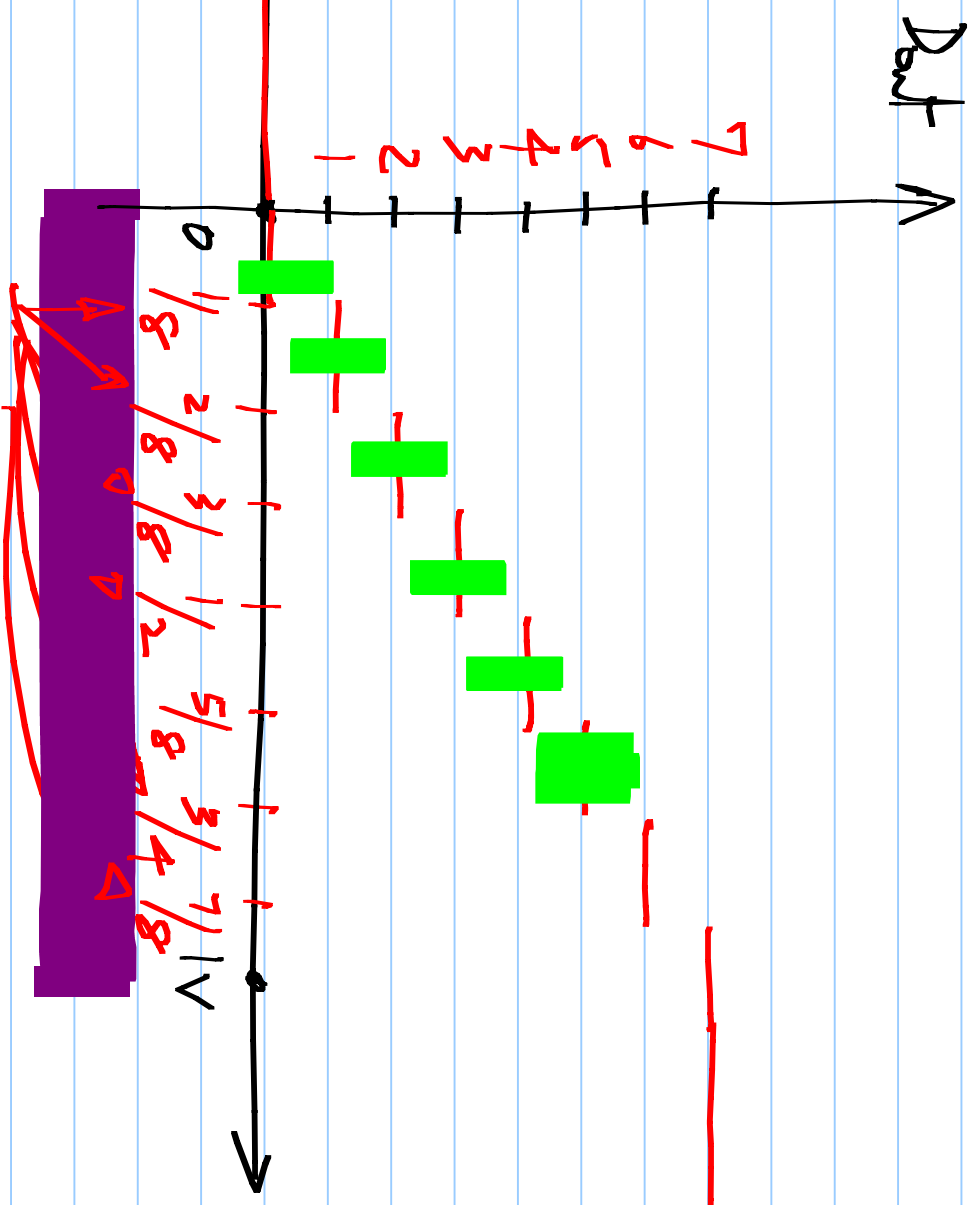
$$\text{rect}\left(\frac{t - T_s/2}{T_s}\right) \xrightarrow{\mathcal{F}} T_s \text{sinc}(f \cdot T_s)$$

Sampling + Quantization

Analog-to-digital conversion

A-D conversion

Analog-to-digital converter (ADC)



3-bit- ADC
8-level ADC

7 transitions
 points

DNL / INL

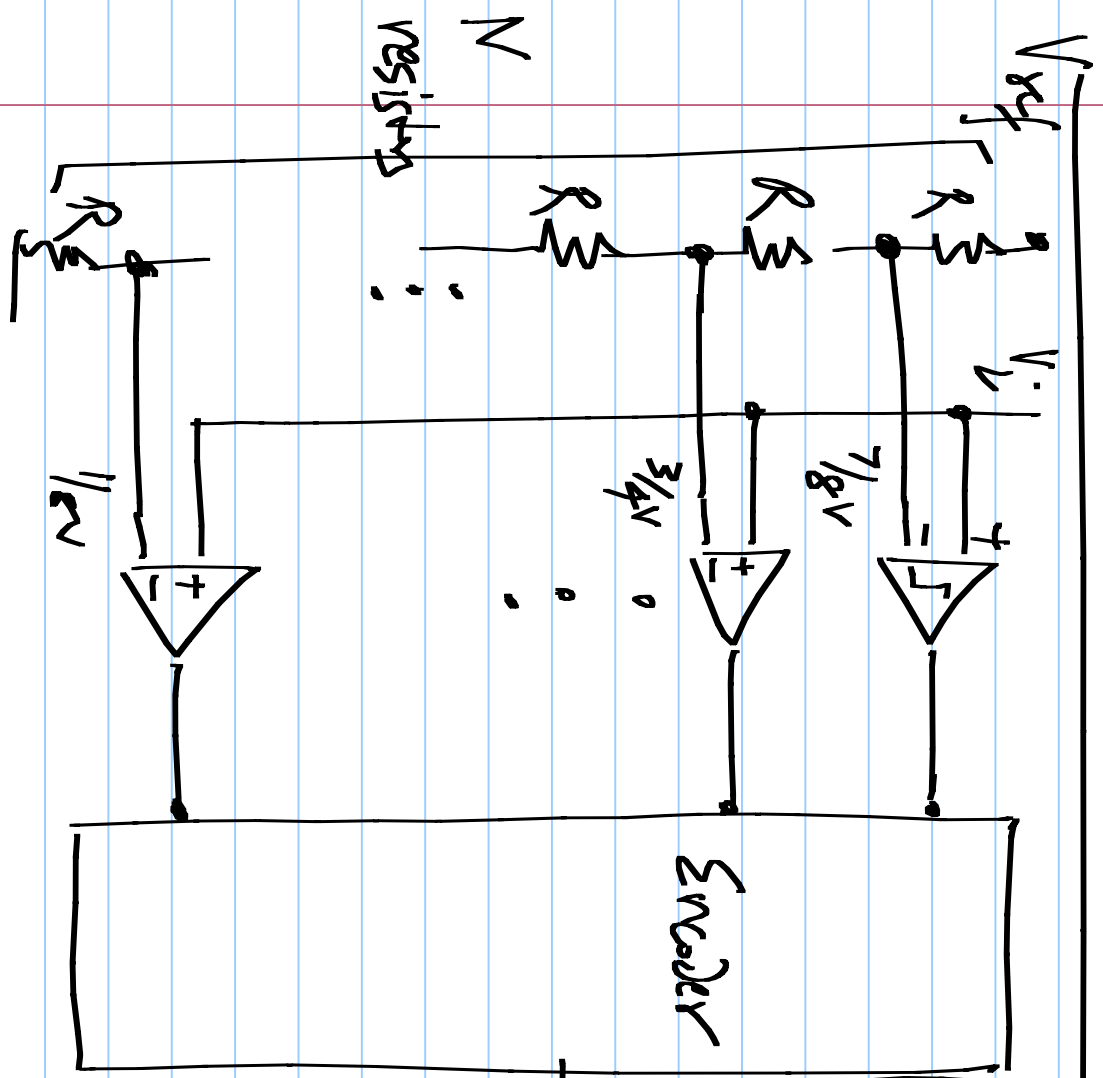
Differential

non-linearity

Integral non-linearity

N -level ADC $\Rightarrow N-1$ transition points $\Rightarrow N-1$

comparators



Flash A/D Converter

High speed

low-resolution

3 bits

(small # levels)

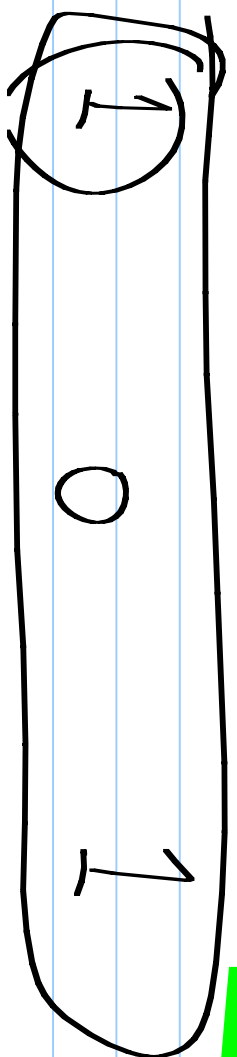
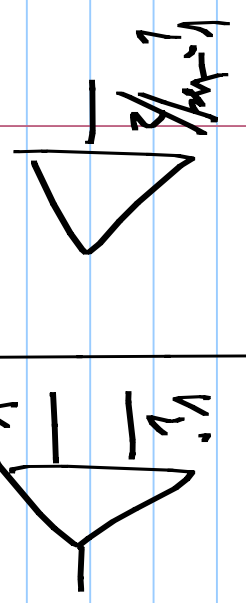
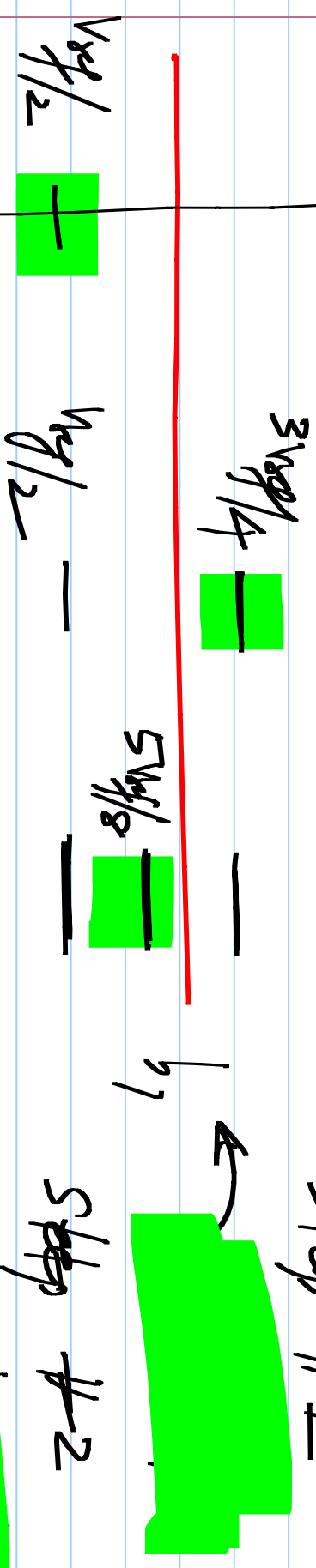
ADCs

≤ 7 bits

Step #1 Step #2 Step #3 Comparator i/p

V_{ref}

V_i



b_3 b_2 b_1

Step #1 Step #2

Comparator i/p

$= 101$