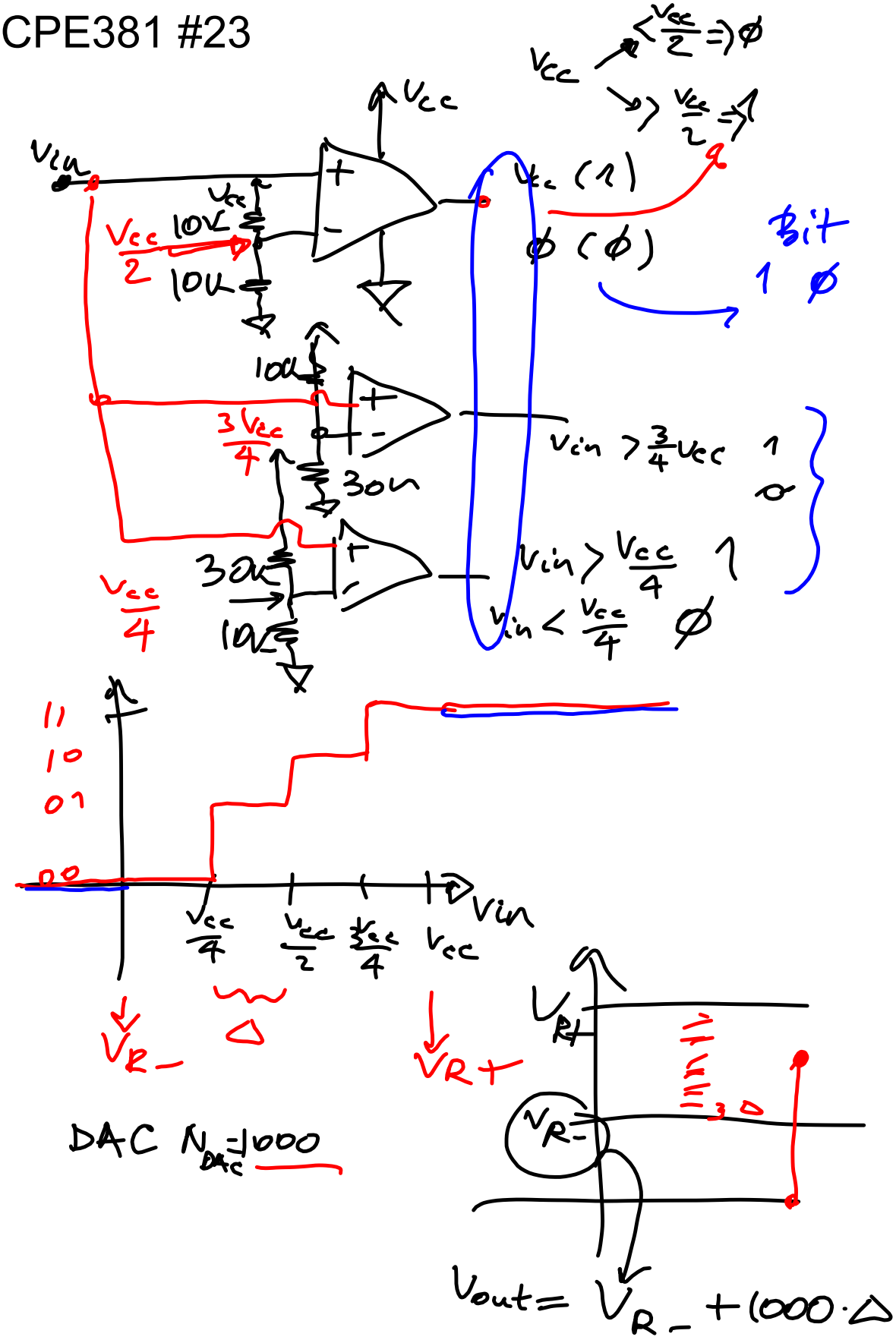
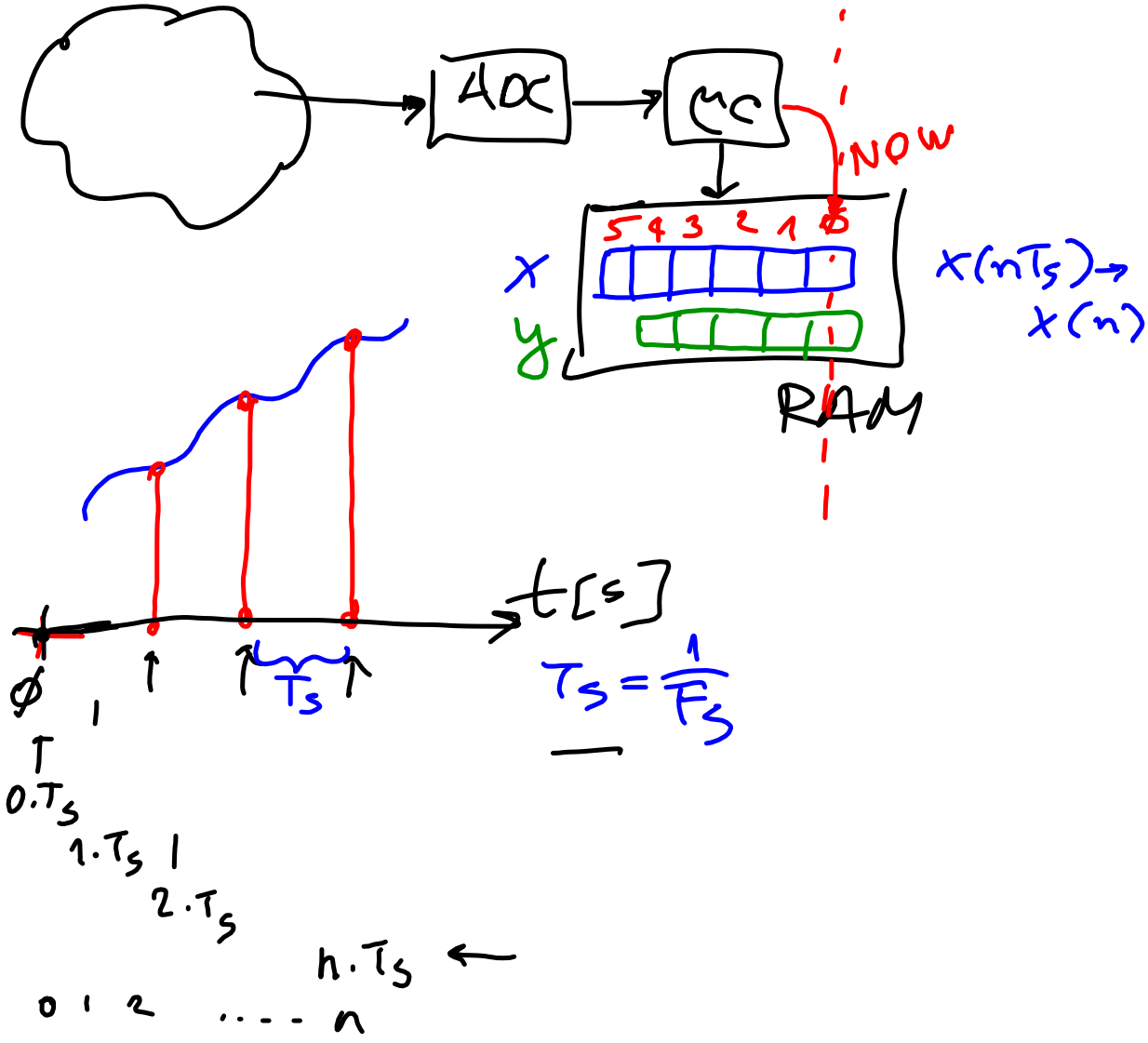
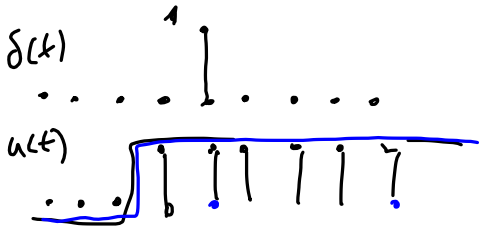
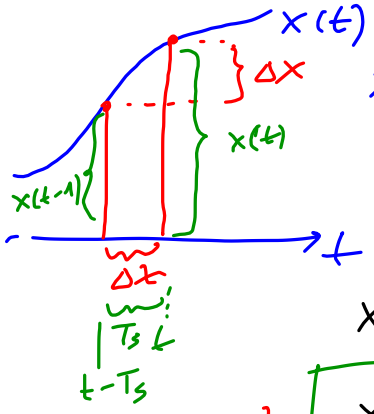
CPE381 #23


Vcc
Vin
10k
10k
Vcc/2
Vcc (1)
0 (0)
Bit
1 0
10k
3Vcc/4
30k
Vin > 3/4 Vcc 1
or
Vcc/4
30k
10k
Vin > Vcc/4 1
Vin < Vcc/4 0
11
10
01
00
Vcc/4
Vcc/2
3Vcc/4
Vcc
Vin
VR-
Δ
VR+
DAC NDAC=1000
VR+
VR-
3Δ
Vout = VR- + 1000·Δ


ADC
μC
NOW
5 4 3 2 1 0
x
y
x(nTs)→
x(n)
RAM
t[s]
Ts
Ts = 1/Fs
0.Ts
1.Ts
2.Ts
n.Ts
0 1 2 .... n



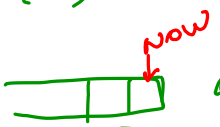


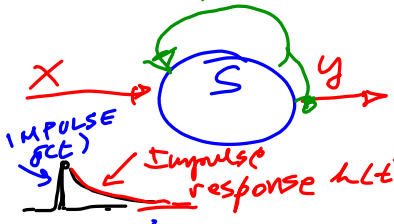
$x'(t)$

$$x'(t) = \lim_{\Delta t \to 0} \frac{\Delta x}{\Delta t}$$

$$x'(t) = \frac{x(t) - x(t-1)}{t - (t - T_s)}$$

$$x'[n] = \frac{x(n) - x(n-1)}{T_s}$$





FINITE RESPONSE

FIR

IIR

$$\frac{x(n) + x(n-1) + x(n-2)}{3}$$

$$\frac{1}{3}x(n) + \frac{1}{3}x(n-1) + \frac{1}{3}x(n-2)$$

b = [1/3 1/3 1/3] ← x

a ← y

$$y[n] = \sum_i b_i \cdot x_i - \sum_j a_j y_j$$

y=filter(b, a, x)

fdatool → b NB, a NA → .h → C

GENERAL FORMULA:

$y[n] = \ldots y[n-1] \ldots \quad x$

– INITIAL CONDITIONS

$y[n-1] = \ldots y[n-2] \ldots$

$y[n] = a \cdot y[n-1] + b \cdot x[n]$

$y[n] = a \cdot (a \cdot y[n-2] + b \cdot x[n-1]) + b \cdot x[n]$

$= a^2 y[n-2] + b(x[n] + x[n-1])$

$\vdots$

$y[0] = a \cdot y[-1] + b x[0]$

$y[n] = \sum_{k=0}^{n} b \cdot a^k x[n-k] \qquad n \geq 0$

$y[n]$ . . . .

$h[n] =$ . . . δ

$y[n] = a\,y[n-1] + x[n]$

$h[n]$ for $x[n] = \delta[n]$

$h[0] = a \cdot h[-1] + 1$

$h[1] = a \cdot h[0] + 0$

$h[2] = a \cdot h[1] + 0$

$h[n] = a \cdot h[n-1] + 0$

HW

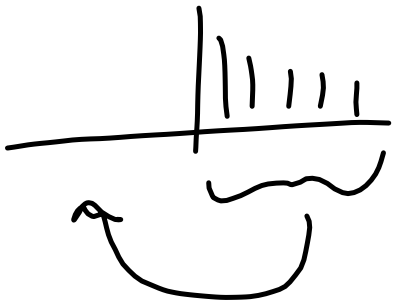
$h[n] = a^{-}$ . . .

$h[n] =$ . . . $+ \delta[n]$

$h[n-2] =$ . . . $\delta[n-2]$

. . . $\delta(n)$

$$\int_{-\infty}^{+\infty} x(\tau)\, h(t-\tau)\, d\tau$$



Apr 6-3:41 PM