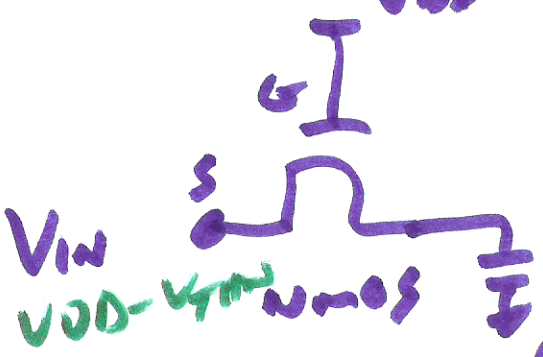
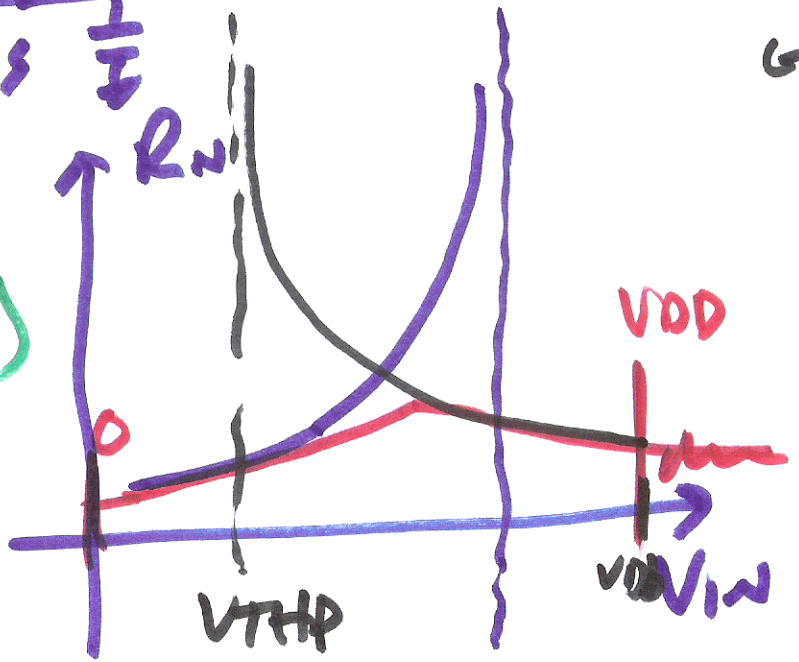
Dynamic Analog Circuits

25.1/25.2



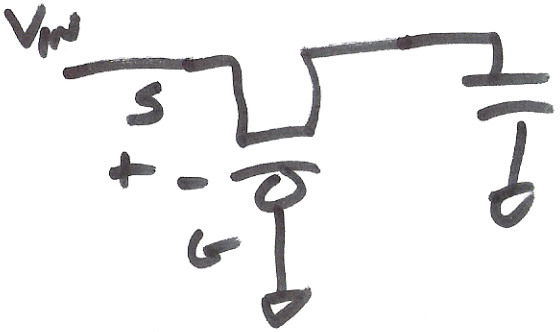
$V_{DS} = V_{DD} - (V_{DD} - V_{THN})$

$V_{DS} = V_{THN}$



VDD - VTHN

pass gate



$V_{SG} = V_{THP}$ shuts off

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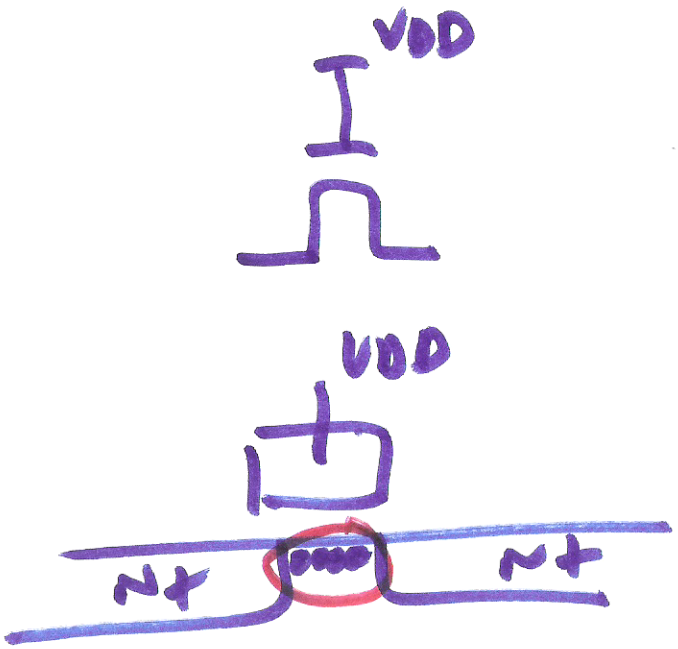
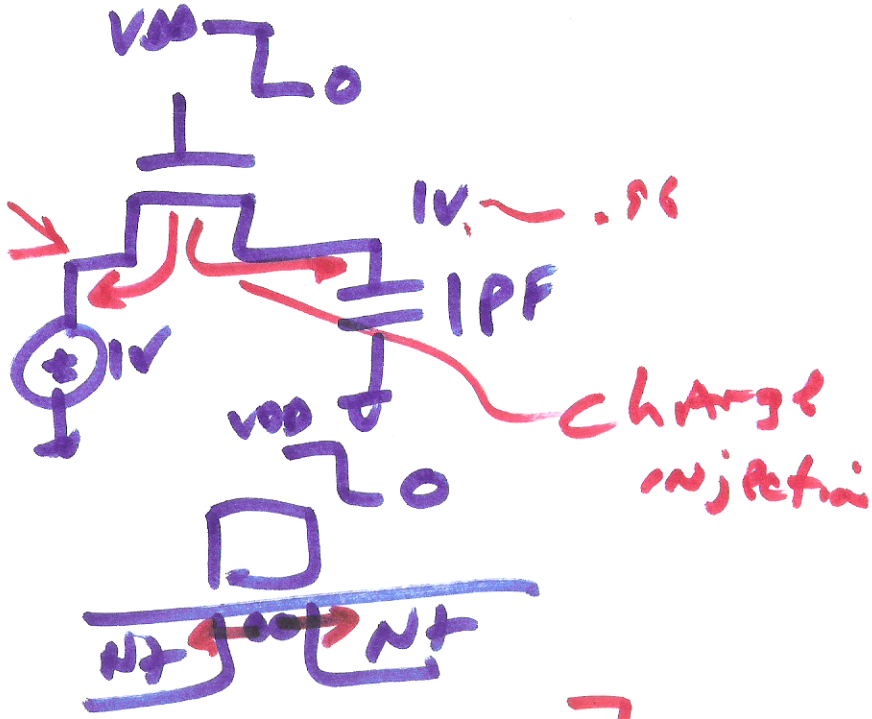
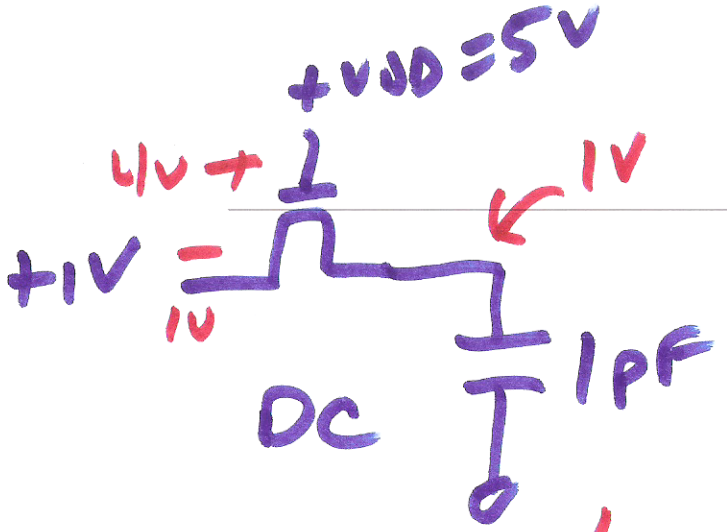
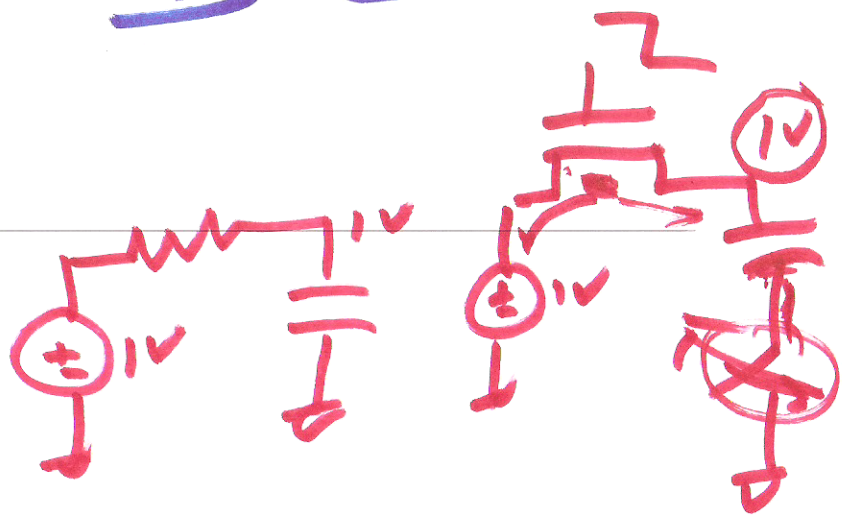
1)





charge injection





Turn isn't important

(Not talking about RC delay)

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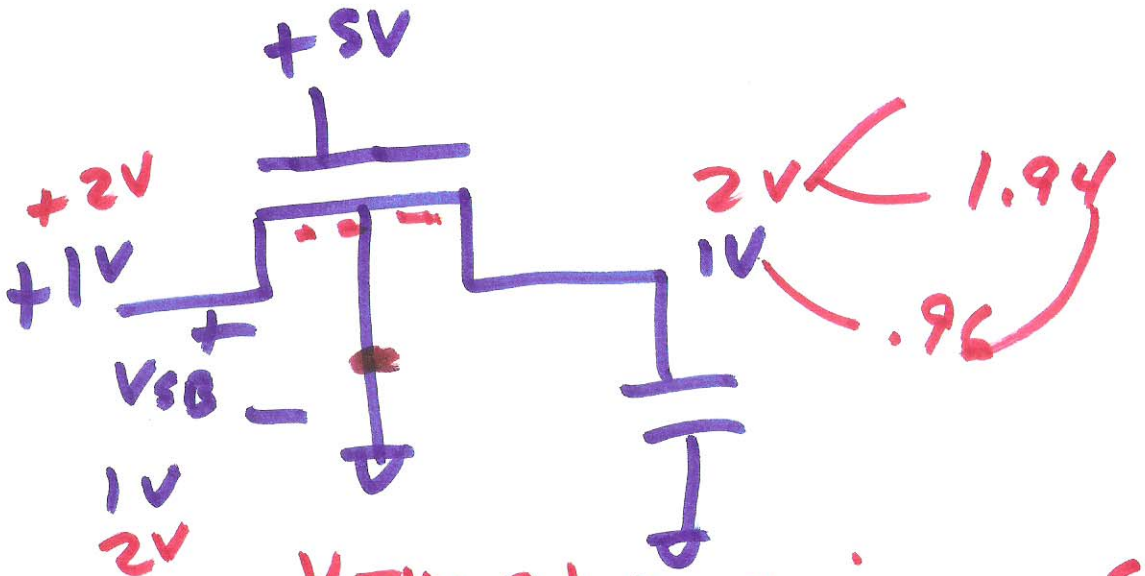
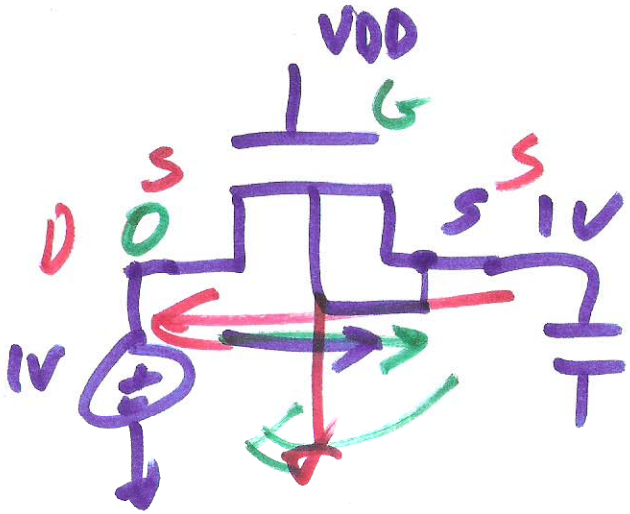
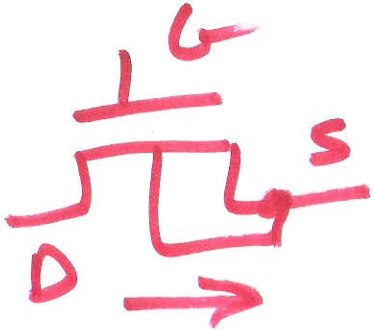
Charge injection causes NON-linearity (distortion)



V_{THN} @ charge is NONlinearity,





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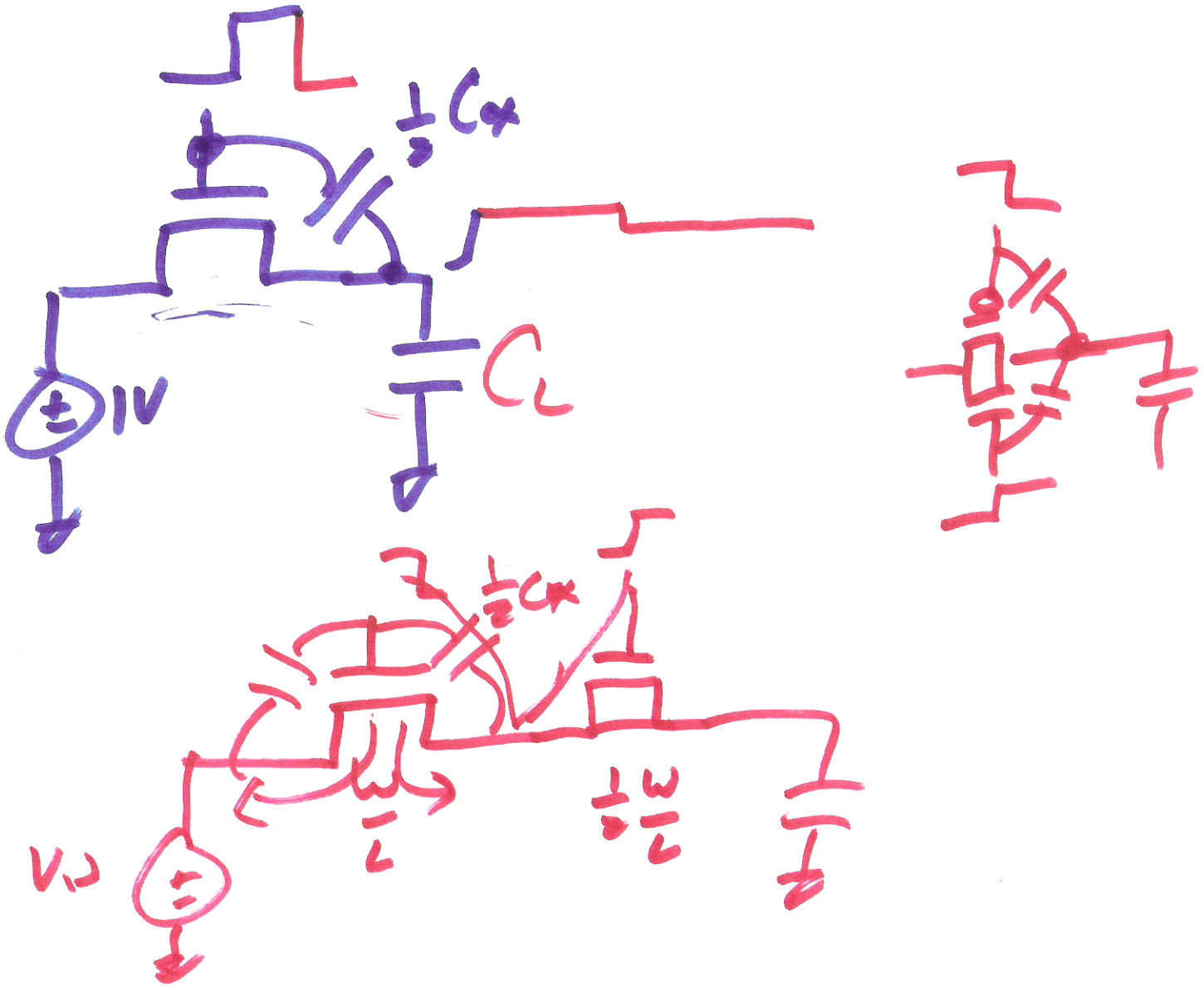
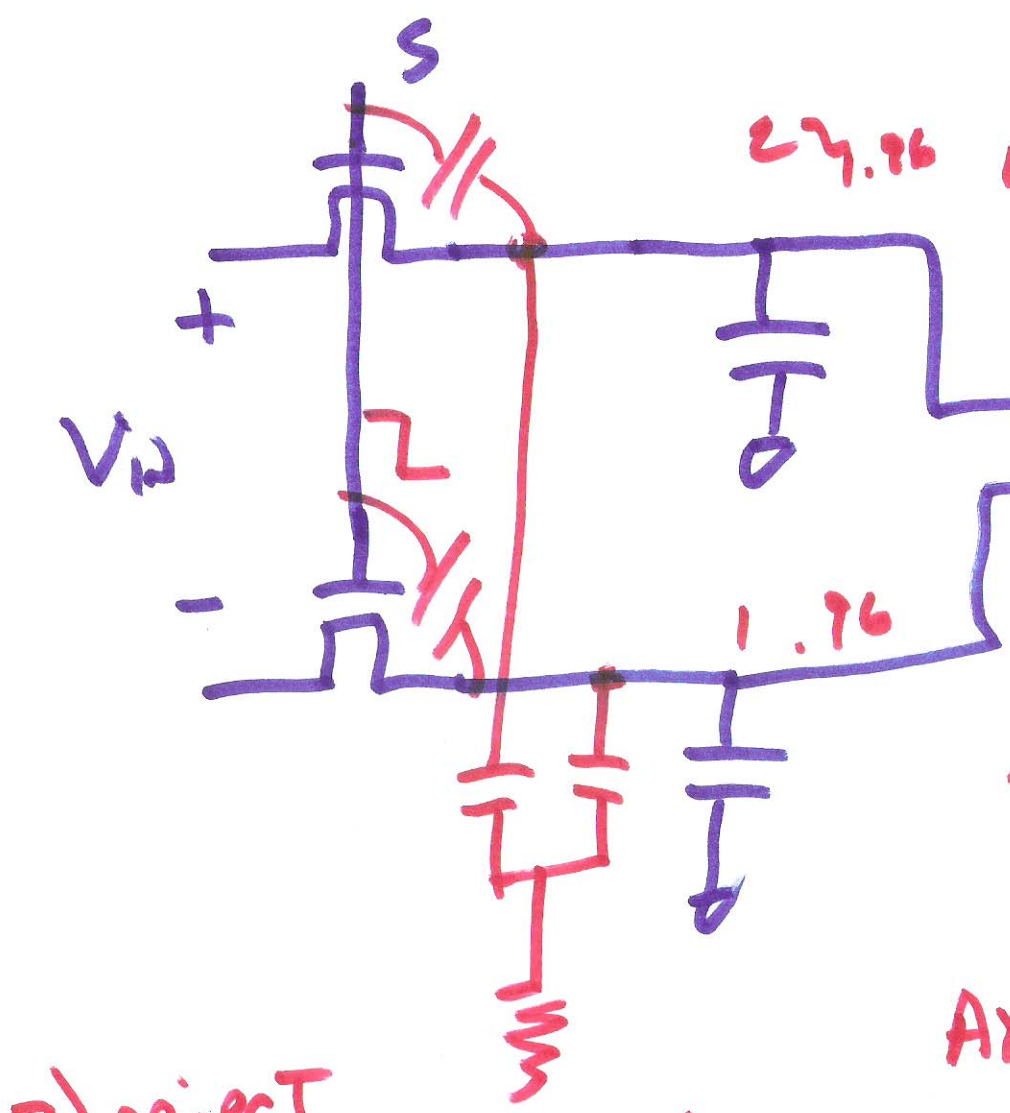
Capacitive feed through





f.d. design

1) Reduction in the effects of coupled noise

$Ax + Bx^2 + Cx^3 + Dx^4$

$A(-x) + B(-x)^2 + C(-x)^3$

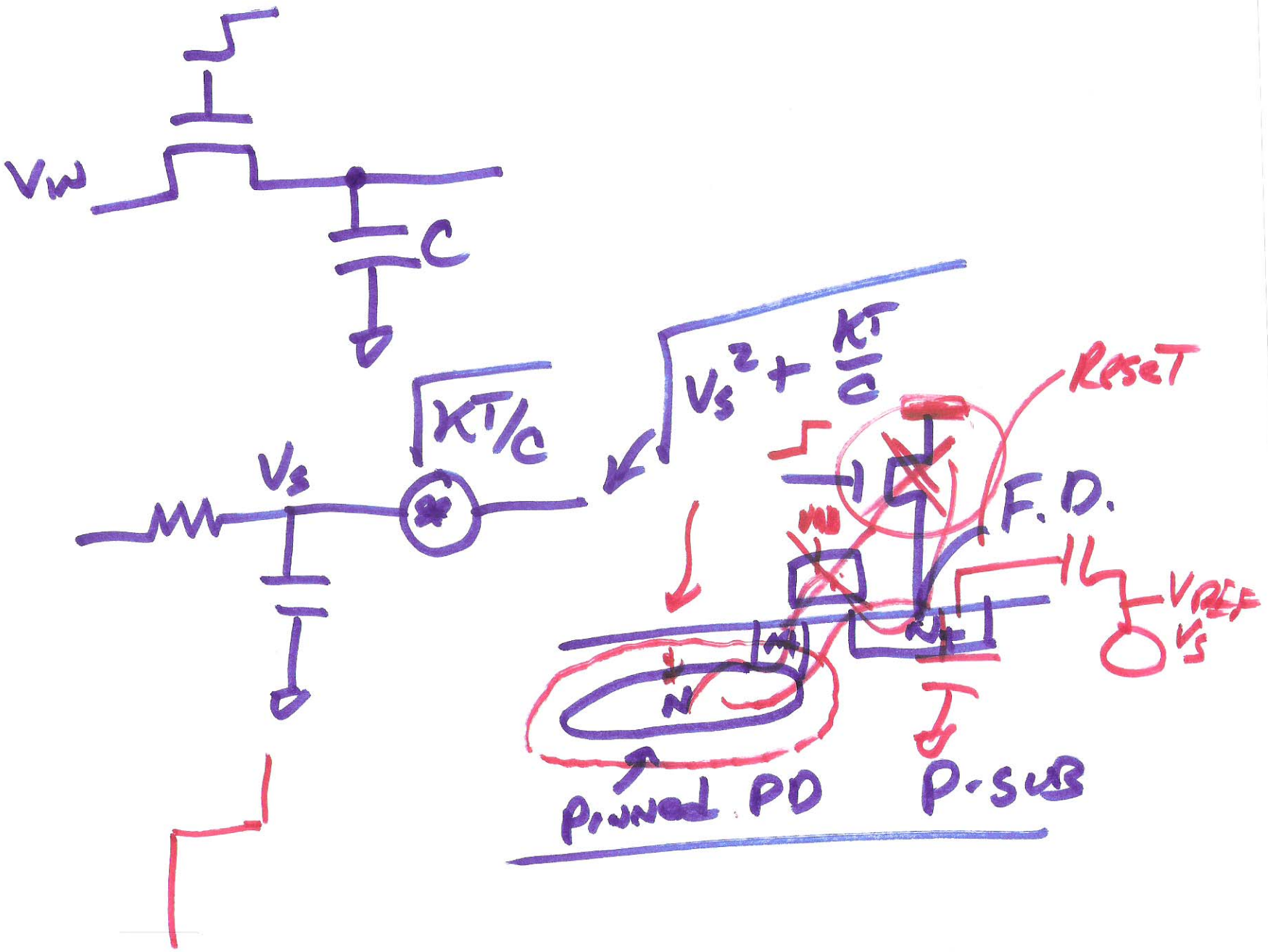
2) even-order distortion harmonics cancel out

$Ax - (-Ax) = 2Ax$

$Bx^2 - Bx^2 = 0$

$Cx^3 - C(-x^3) = 2Cx^3$

3) reject charge injection and comp. feedthrough



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10-bit ADC

$V_{REF+} - V_{REF-} = 1.024V$

$LSB = \frac{2^{10}}{1.024} = 1mV$

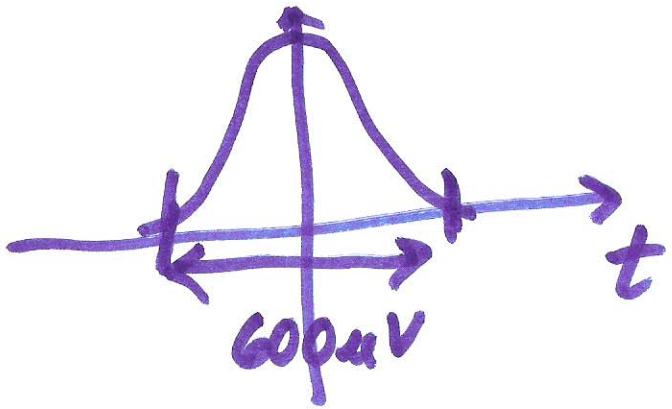
000000 0000 → 0

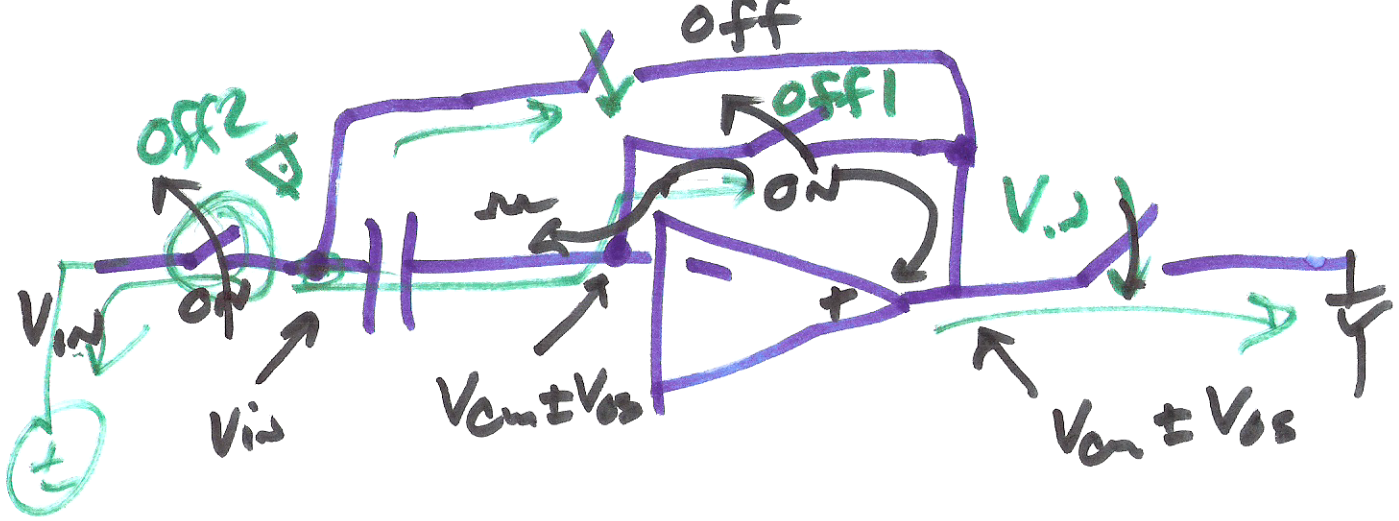
1111111111 → 1.023V

Neglect ½ LSB

Estimate size of hold capacitors required

$V_{Noise} = 100mV$ Voltage




off
off2
off1
ON
OP
V_{in}
V_{in}
$V_{Cm} \pm V_{os}$
$V_{Cm} \pm V_{os}$