

Switched Capacitors

Switches

Capacitors

MUX

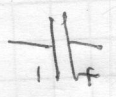
PGA

input offset voltage

2nd stage

Capacitors

$Q = CV$ $high?$



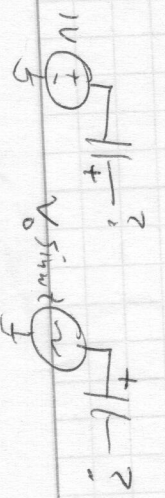
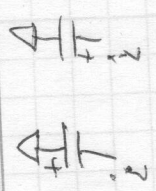
$Q_+ = -Q_-$

real capacitors have parasitics: "top" "bottom"

Charge a cap to 1V



Unplug



Project teams - 15 minutes, be ready

1st oral presentation to me
team intro - background, problem, interests

high level block diagram

preliminary assignment of tasks

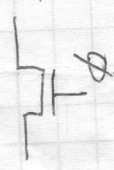
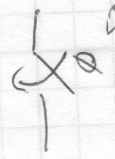
BG + FC results (lass)

Questions

Week 14

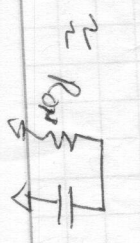
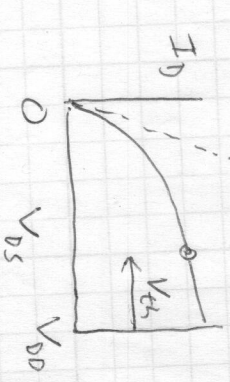
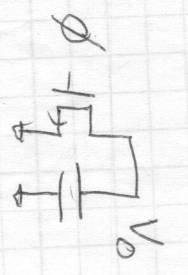
RPR week final presentation in class

Switches



nonlinear resistor

parasitic capacitors \Rightarrow charge injection



$R_{ov} = \frac{1}{\left. \frac{\partial I_D}{\partial V_{gs}} \right|_{V_{gs}=0}}$

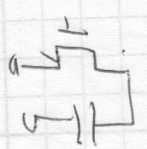
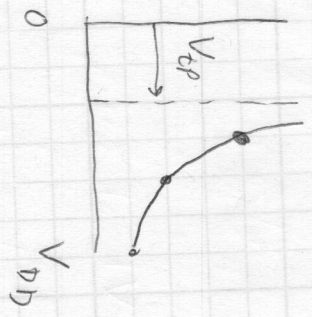
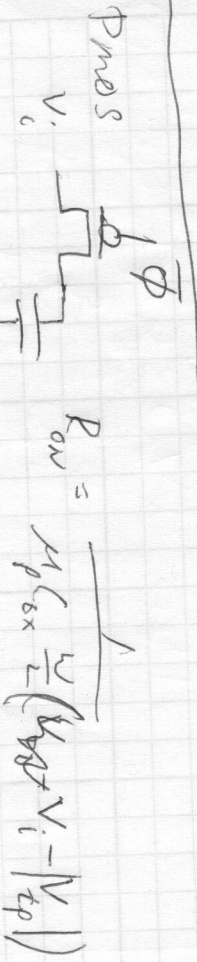
$$I_D = \mu_n C_{ox} \frac{W}{L} (V_{GS} - V_{th} - \frac{1}{2} V_{DS}) V_{DS}$$

in triode

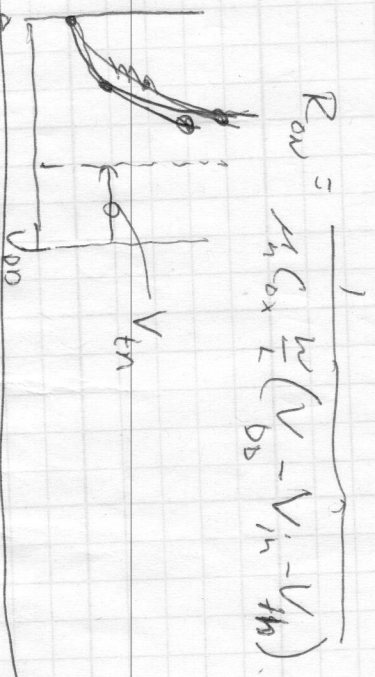
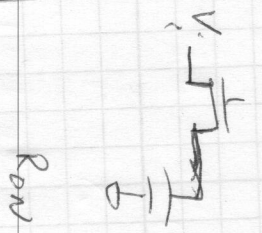
$$\frac{\partial I_D}{\partial V_{DS}} \Big|_{V_{DS}=0} = \mu_n C_{ox} \frac{W}{L} \left[V_{GS} - V_{th} - \frac{1}{2} V_{DS} + V_{DS} \left(\frac{-1}{2} \right) \right]$$

$$= \mu_n C_{ox} \frac{W}{L} (V_{DD} - V_{th})$$

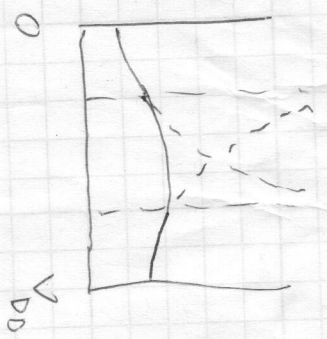
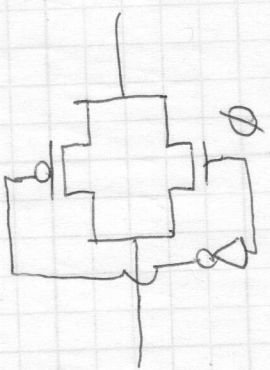
$$R_{on} = \frac{1}{\mu_n C_{ox} \frac{W}{L} (V_{DD} - V_{th})}$$



$$V_o(t) = V_o e^{-t/\tau} \quad \tau = R_{on} C$$



Back-to-back



MUX is easy

