

Lecture # 34

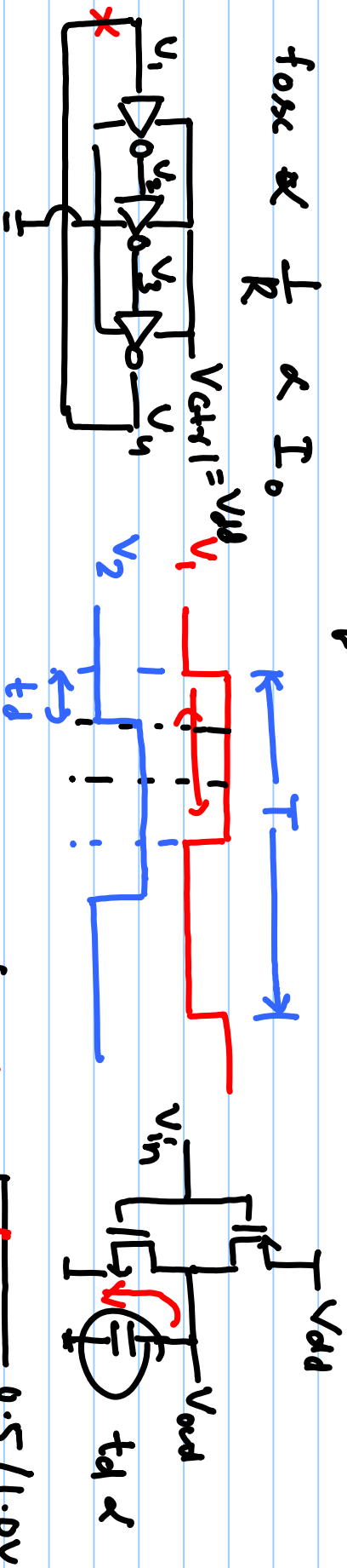
Oscillators

Differential oscillator — limited o/p swing → large o/p swing
 constant current noise

PSRR

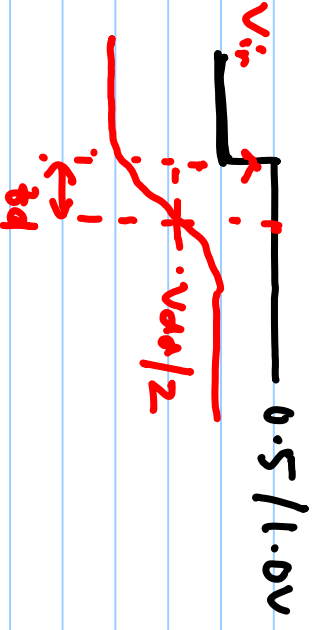
$$V_{out} = I_0 R = V_{DD} - V_{r1}$$

$$f_{osc} \propto \frac{1}{R} \propto I_0$$



$$T = 6 t_d$$

$$f_{osc} = \frac{1}{6 t_d}$$



* Odd number of inverters.

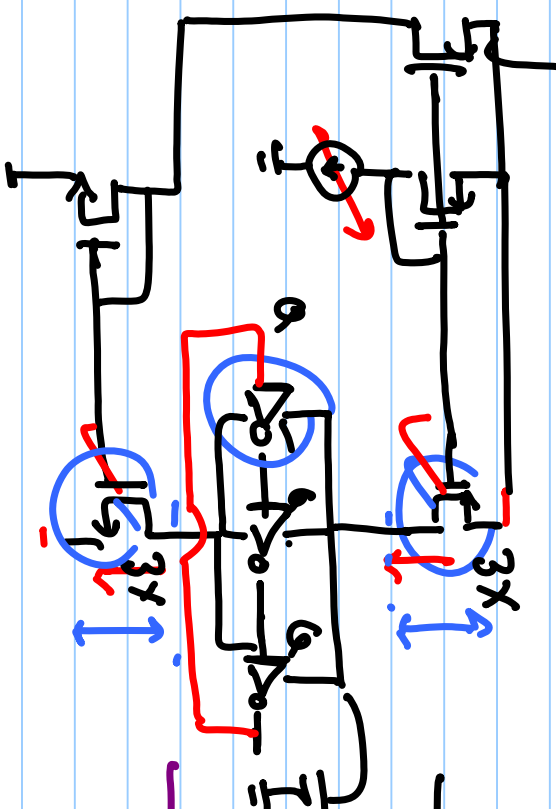
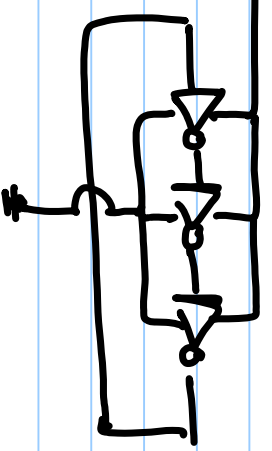
* Large swing oscillator



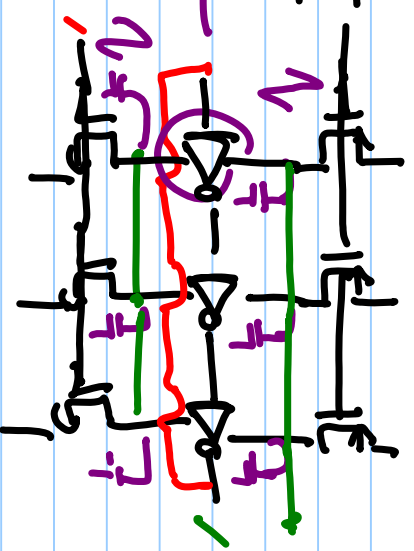
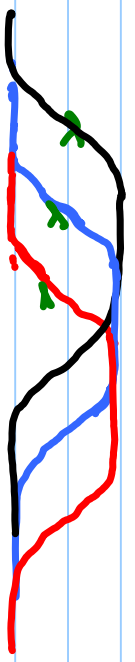
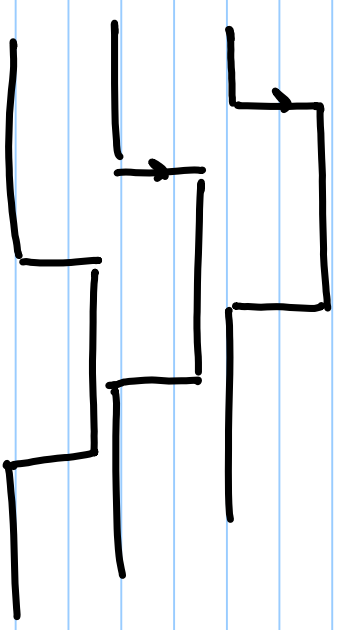
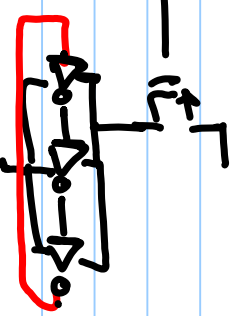
Frequency turning

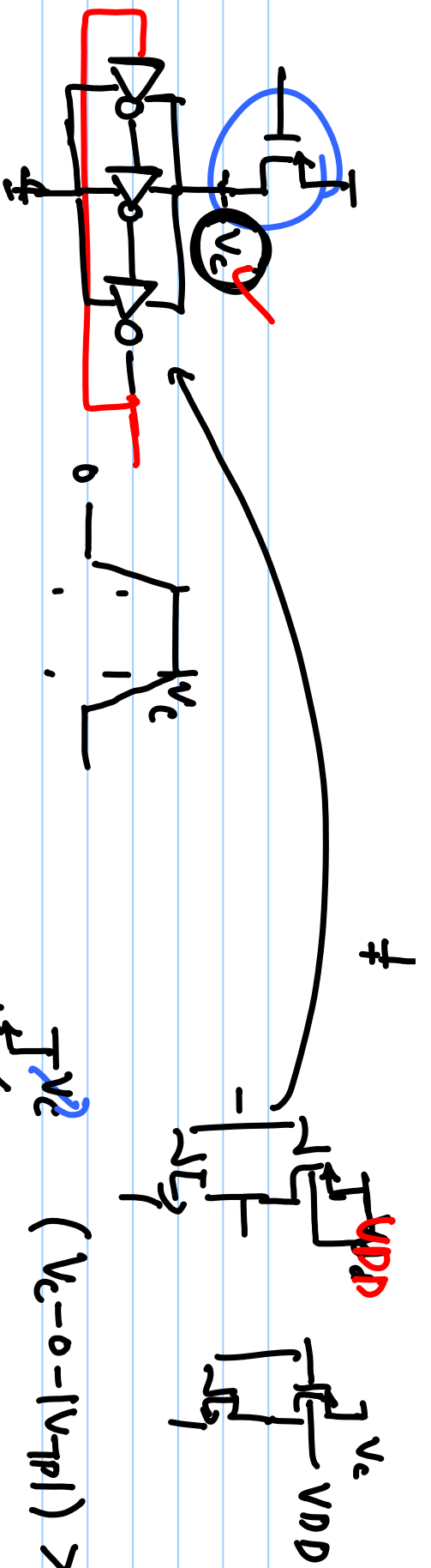
- Numbers of inverters in loop. \rightarrow
- Supply voltage / Current through osc.
- Capacitive load

~~V_{in}~~



V_{bp}

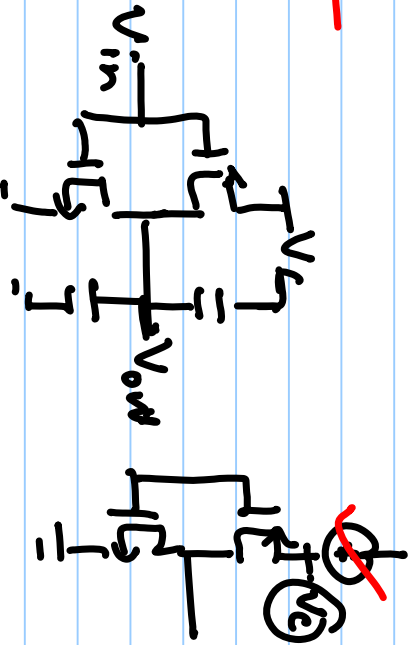
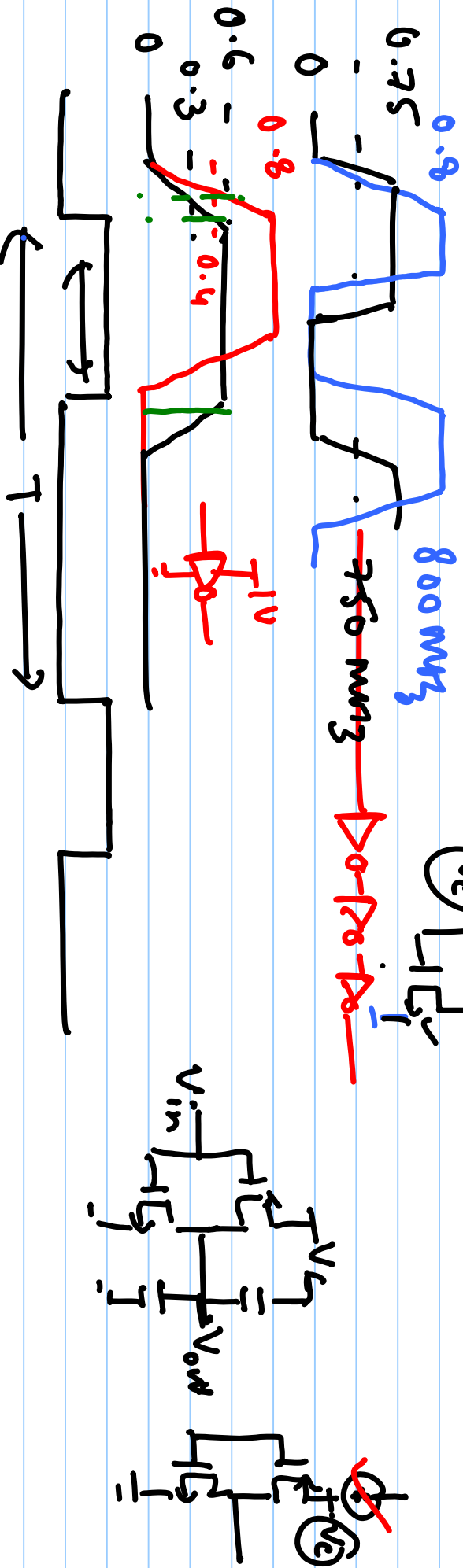


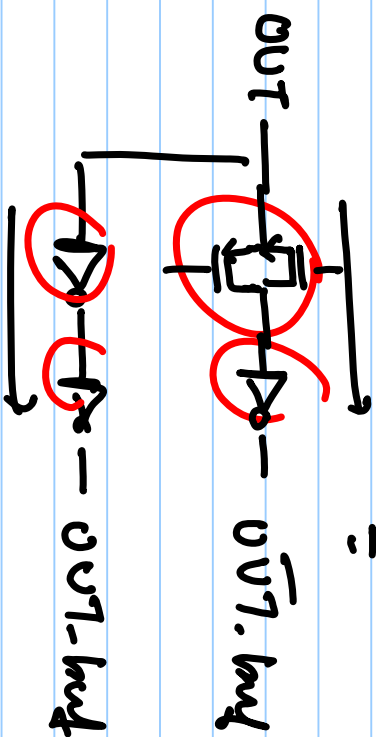
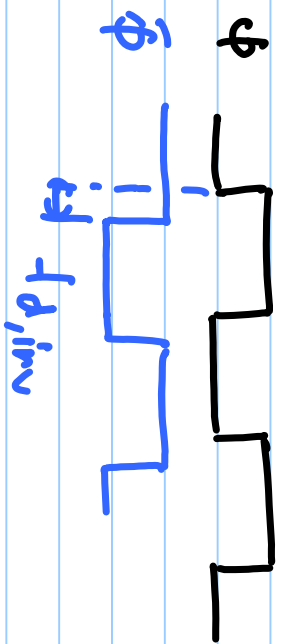
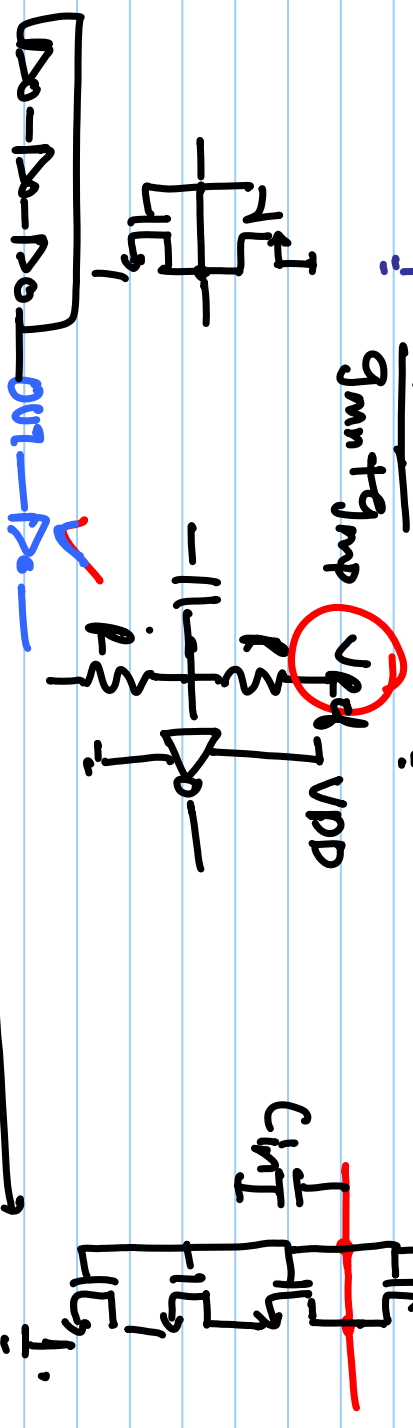
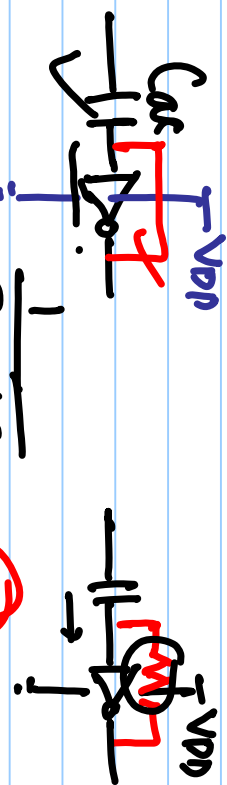
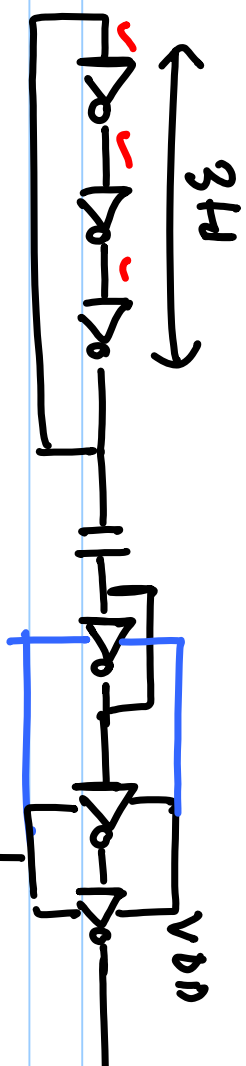


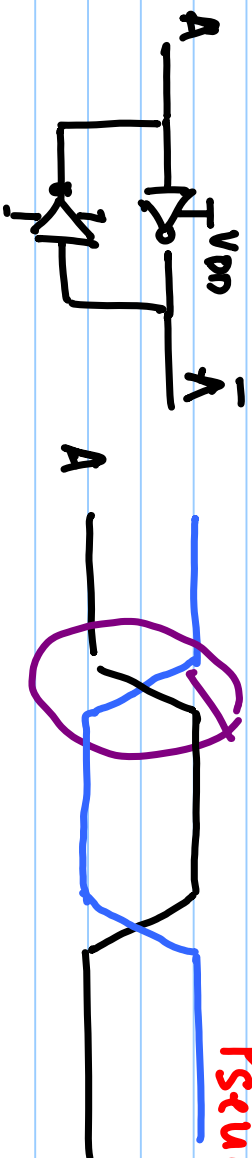
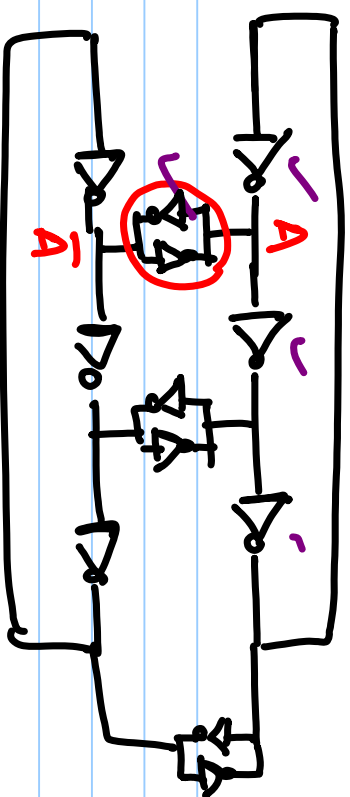
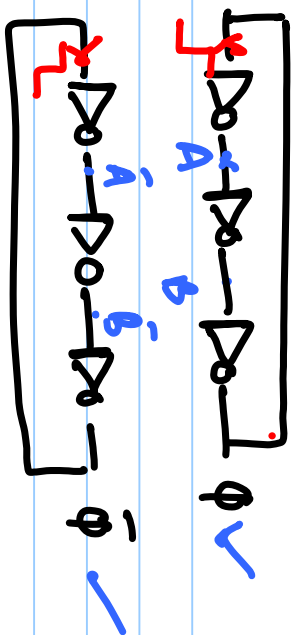
- Max. freq. limited by V_{DD} .

$$(V_c - 0 - V_m) > 0$$

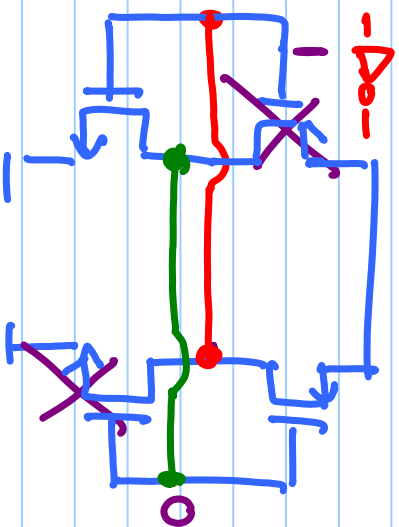
$$(V_c - 0 - |V_{TP}|) > 0$$







Pseudo-differential Ring Osc.



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