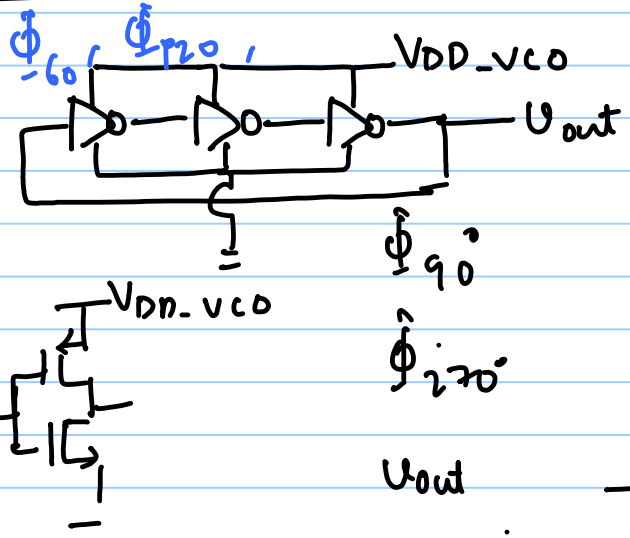
Lecture #24

Note Title 24-09-2018

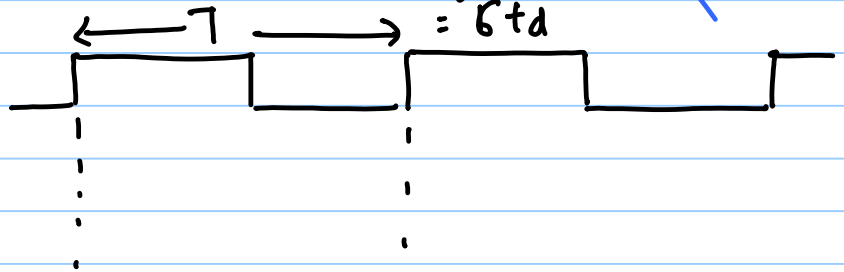


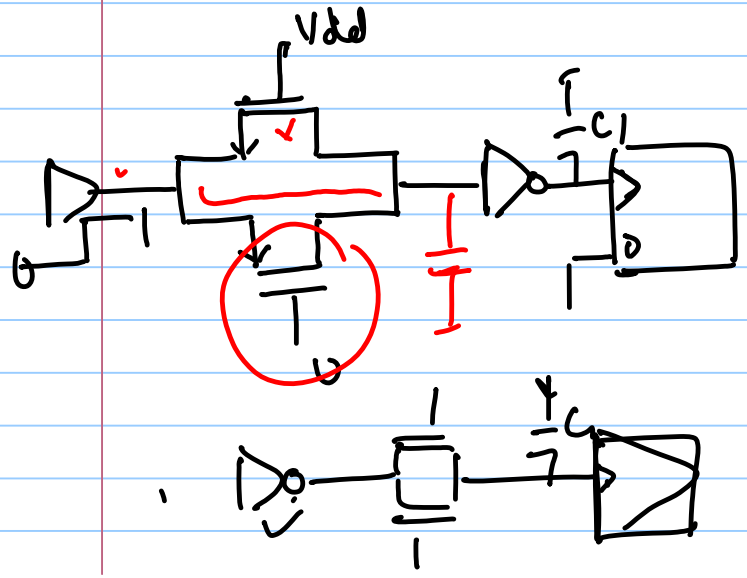
ϕ_{60} : $t_d/6$

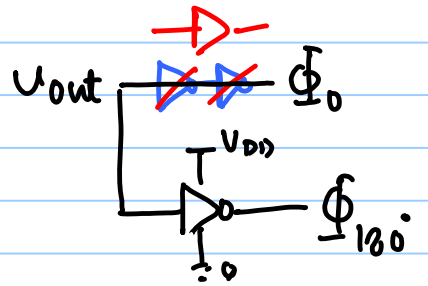
$$f_{out} = K_{VCO} \times V_{DD\text{-}vco}$$

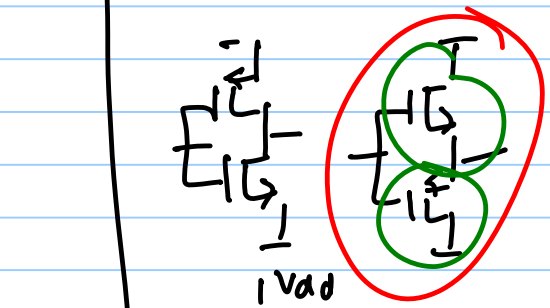
$$f_{out} = \frac{1}{2(N t_d)} = \frac{1}{2(2M+1)\cdot t_d}$$

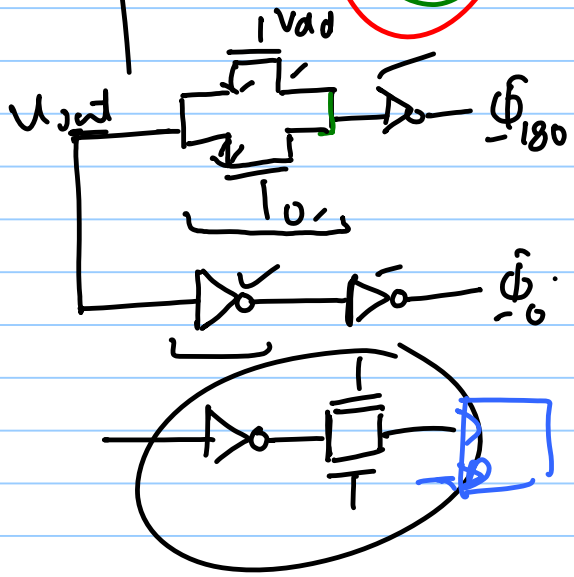
t_d: delay of inverter.

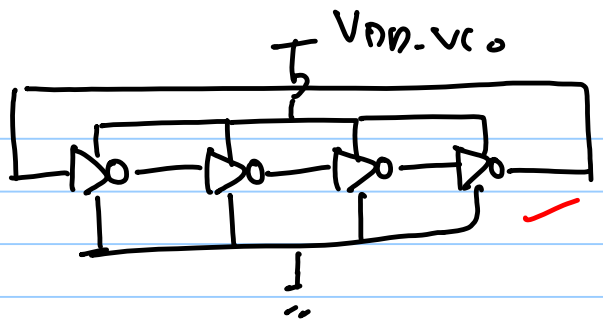


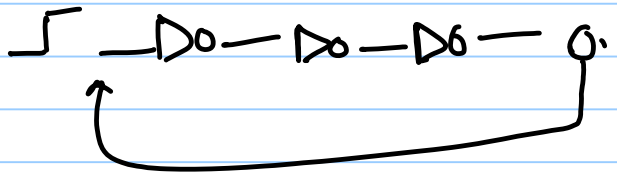


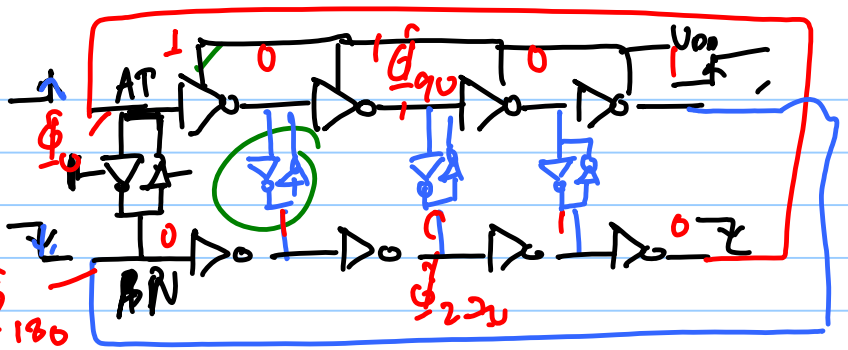


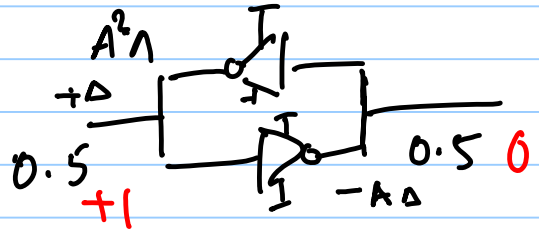




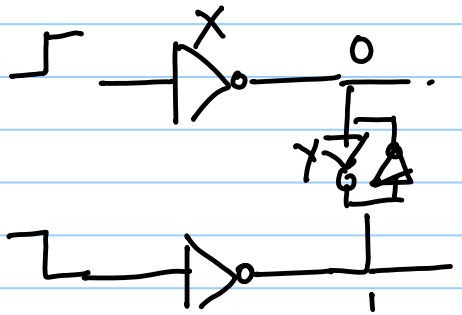








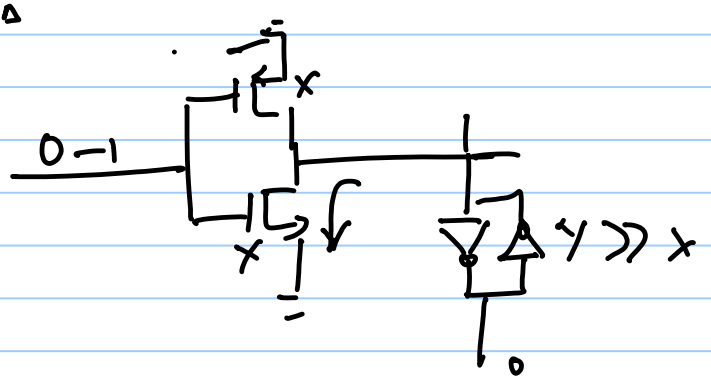
Pseudo-differential ring osci

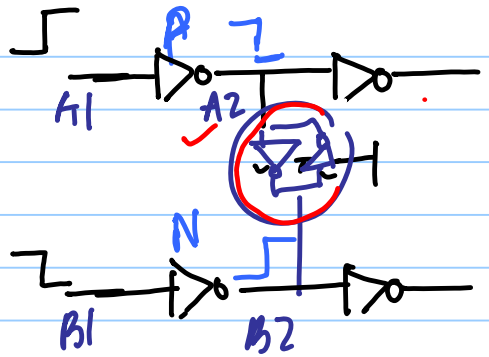


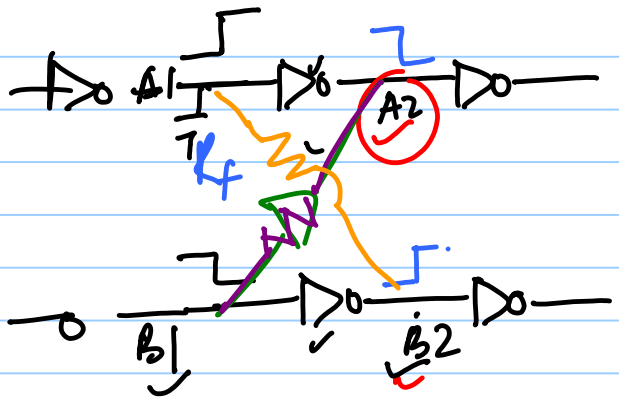
$X \gg Y \quad X$

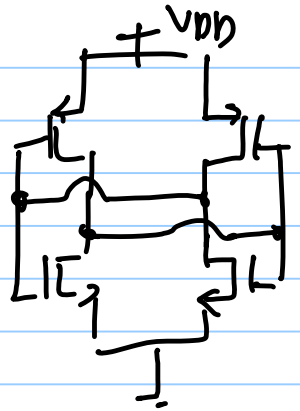
$X \ll Y \quad X$

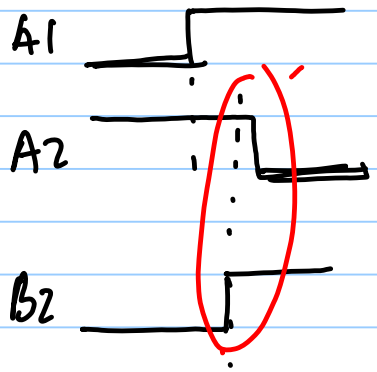
$0 < Y < X$

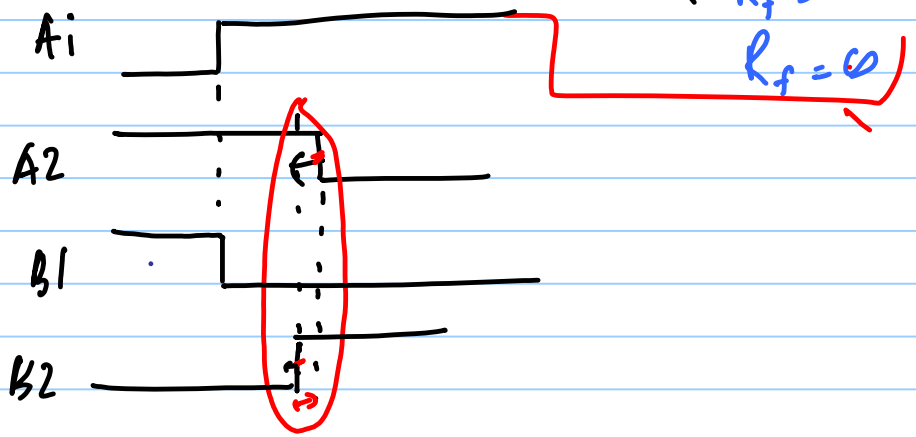


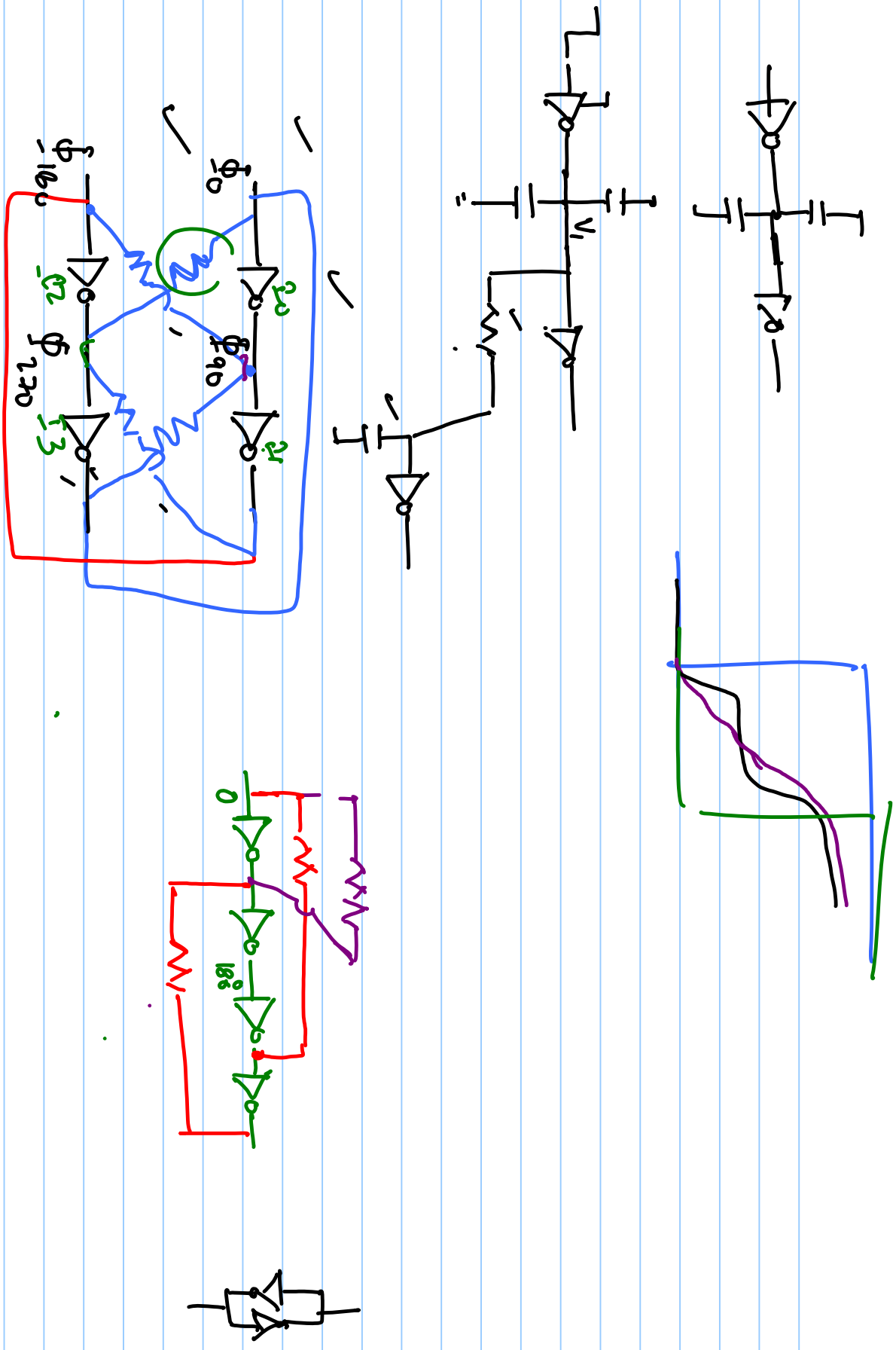

A1
A2
B1
B2
P
N
Z


A1
A2
B1
B2
Z
R_f


VDD


A1
A2
B2


Ai
A2
B1
B2
$R_f = 0$
$R_f = \infty$


0°
90°
180°
270°
I1
I2
I3
I4
V1
V2
0
180°