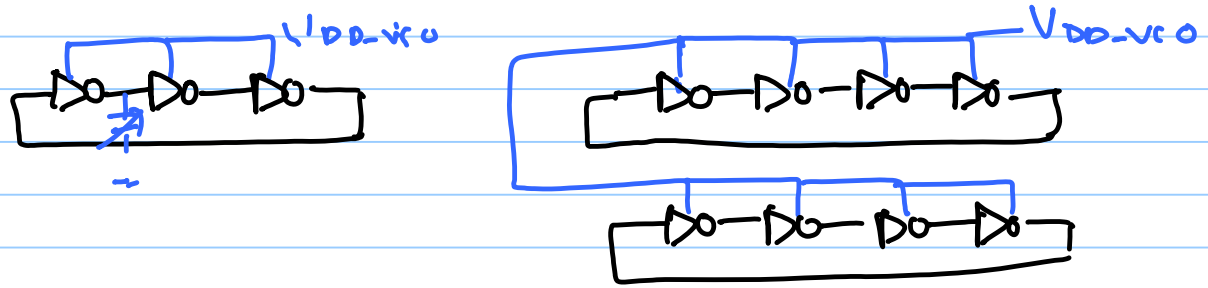
Lecture # 25

Note Title 25-09-2018

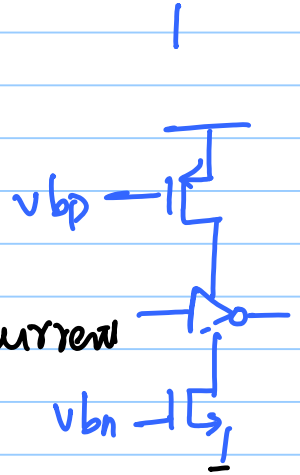


V_{DD_VCO} ⟶ t_d of inverter ⟶ freq. of OSC.

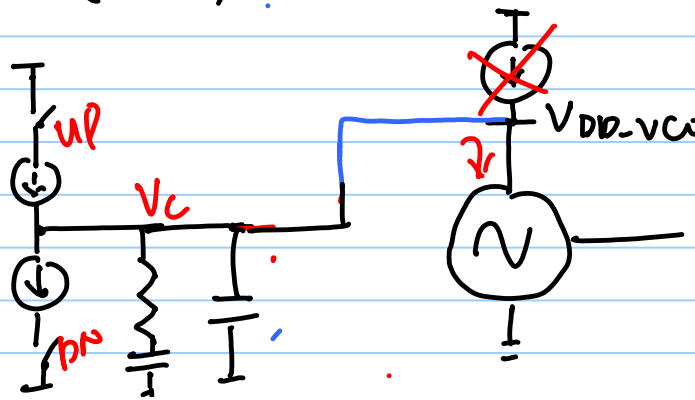
t_d — ∵ V_{DD_VCO}

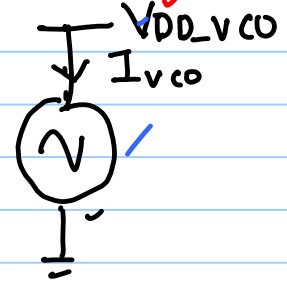
✓ Capacitor —

Current starved inverter — headroom for current source.



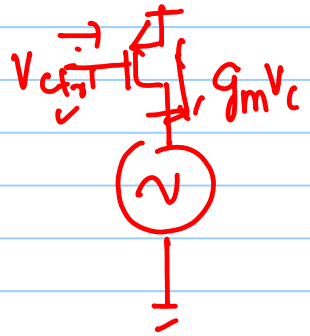
V_{DD_VCO} (V_{CTRL}) : $f_{VCO} = K_{VCO} \cdot V_{CTRL}$ [Hz/V]

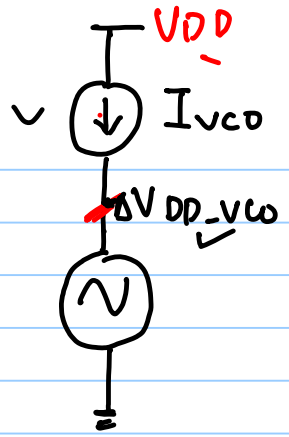




$f_{out} = 1GHz$

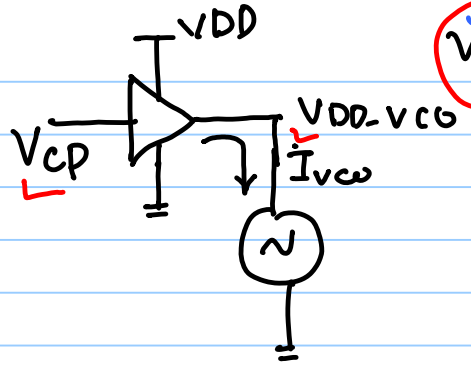
$K_{VCO} = \frac{d f_{out}}{d V_{DD\_VCO}}$





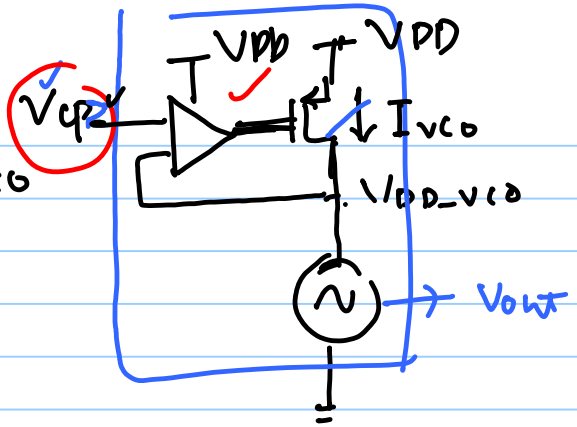
$f_{out} = 1GHz$

$K_{VCO} = \frac{d f_{out}}{d V_{DD\_VCO}}$



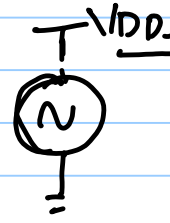
f_{out}

K_{VCO}

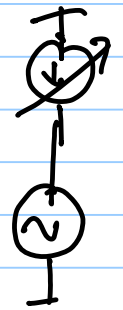


f_{out}

K_{VCO}



'tt'



K_{VCO} : Voltage Controlled Osc.

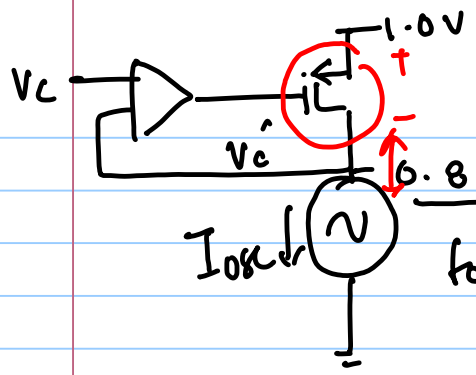
K_{CCO} : Current Controlled Osc.

Process Corners

ss : slow-slow V_{DD_VCO} ↑

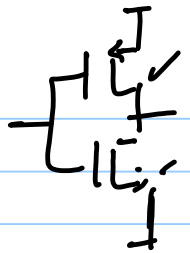
tt :

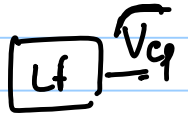
ff : fast-fast V_{DD_VCO} ↓

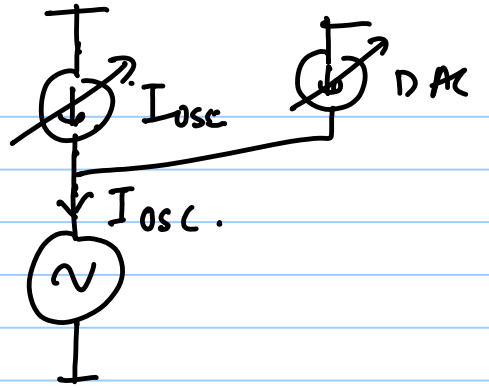


(tt')

$f_0 = 10GHz$.

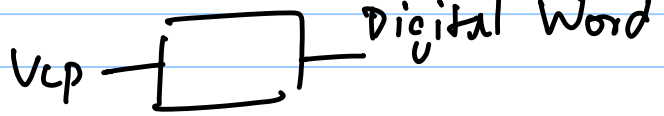


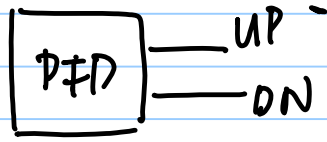


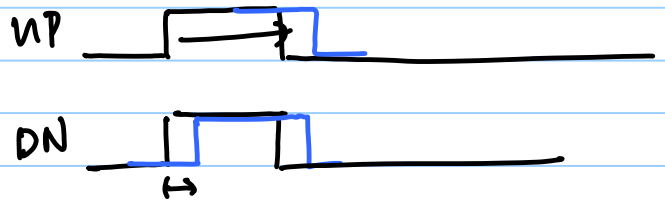


	Vc'	Kvco	Kvco
ss	>0.8V	0.85	1mA
ff	<0.8V	0.75	1mA
tt		0.8	1mA

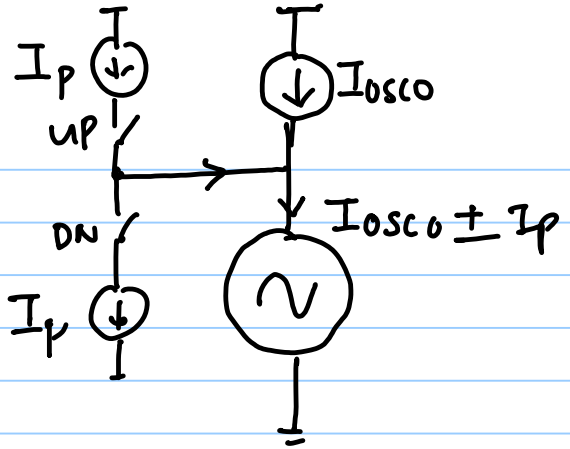
10 GHz/V



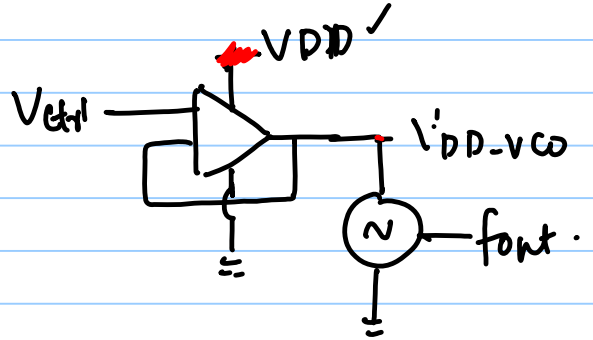




$\Delta T \longrightarrow 2\pi \cdot \frac{\Delta T}{T}$



$$f_{osc} = f_0 + K_{vco} \cdot I_p$$



$$\frac{f_{out}}{V_{DD\_vco}} = K_{vco}$$

$10 \times 10^9 \times 10^{-2} = 10^8$

$$\frac{V_{DD\_vco}}{V_{DD}} =$$

$$\frac{\Phi_{out}}{V_{DD}} = PSRR$$