Lecture 38

Wednesday, October 19, 2016 7:58 AM

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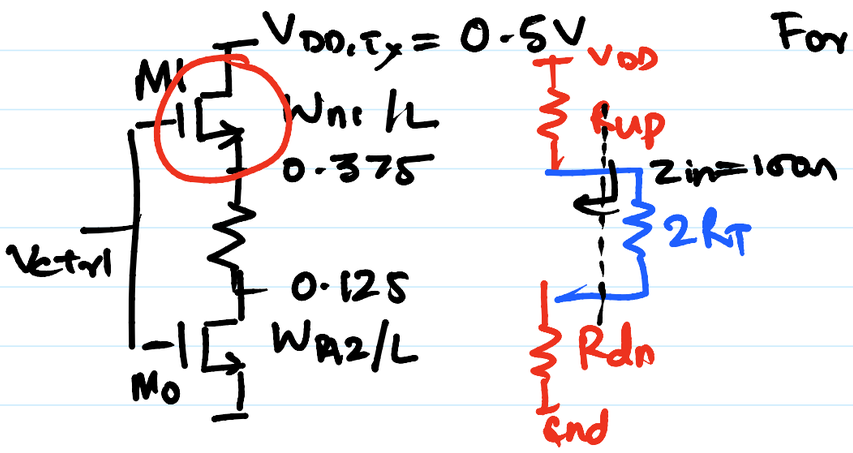


For M1, $R_{up} = \dfrac{1}{K\left(\frac{W_{N1}}{L}\right)(V_{ctrl} - 0.375 - V_T)}$

M0, $R_{dn} = \dfrac{1}{K\left(\frac{W_{N2}}{L}\right)(V_{ctrl} - 0 - V_T)}$

$R_{up} = R_{dn} = 50\Omega$

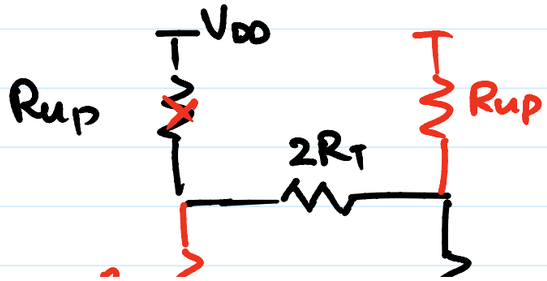
Same V_{ctrl} for M0, M1 $\Rightarrow$ Differential o/p impedance of 100Ω

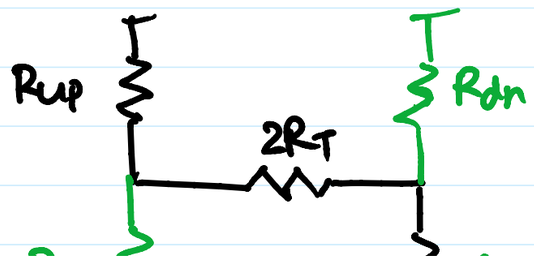
Equalization in VM o/p driver

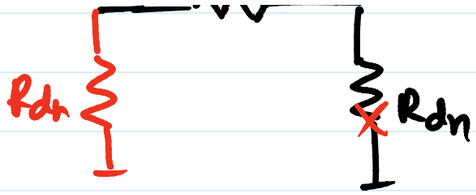
$h_{eq}[n] = 0.8\,\delta(n) - 0.2\,\delta(n-1)$

o/p of Tx = $d[n] * h_{eq}[n] = \overset{\pm 1}{0.8\,d[n]} - \overset{\pm 1}{0.2\,d[n-1]} = y[n]$

d[n]	d[n-1]	y[n]
1	1	0.6
1	−1	1.0
−1	−1	−1.0
−1	1	−0.6



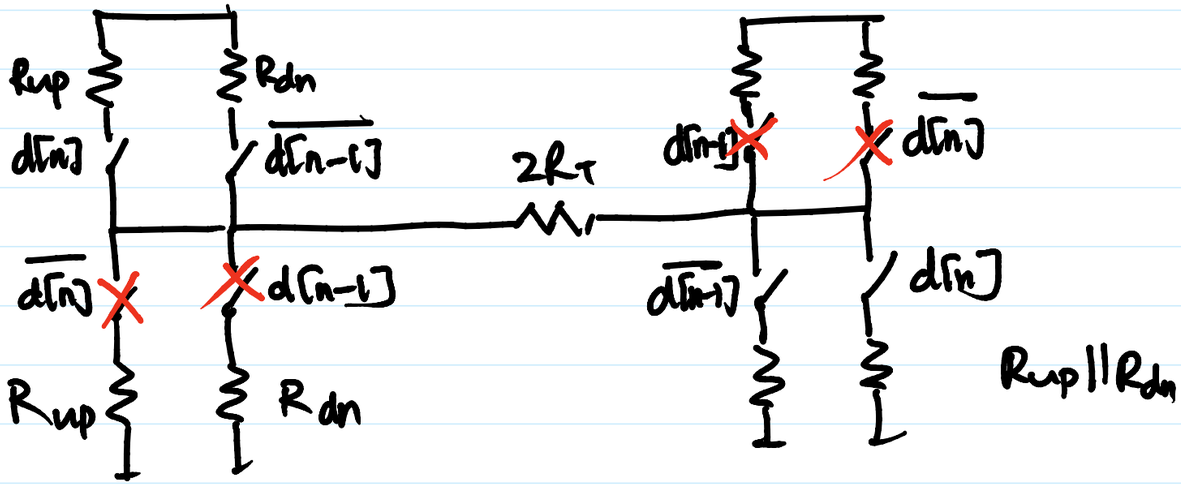




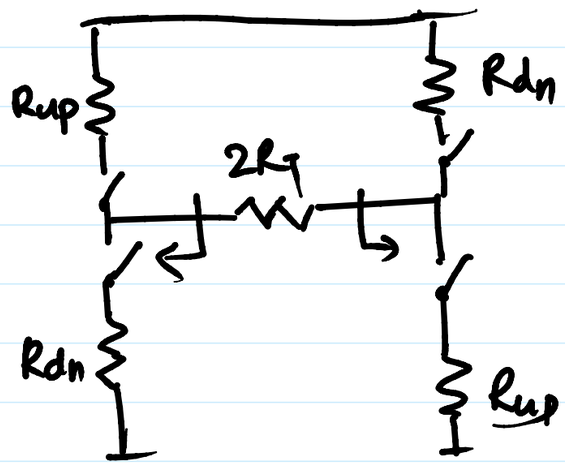
$$R_{up} = R_{dn} = R_T$$

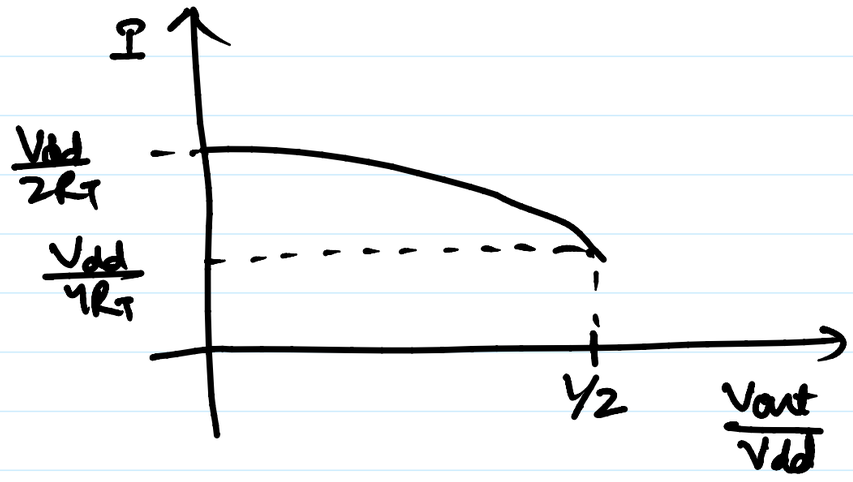
$$V_{out} = \pm \frac{V_{dd}}{2}$$

$R_{up} \| R_{dn}$



d[n]	d[n-1]
1	0
0	1
1	1

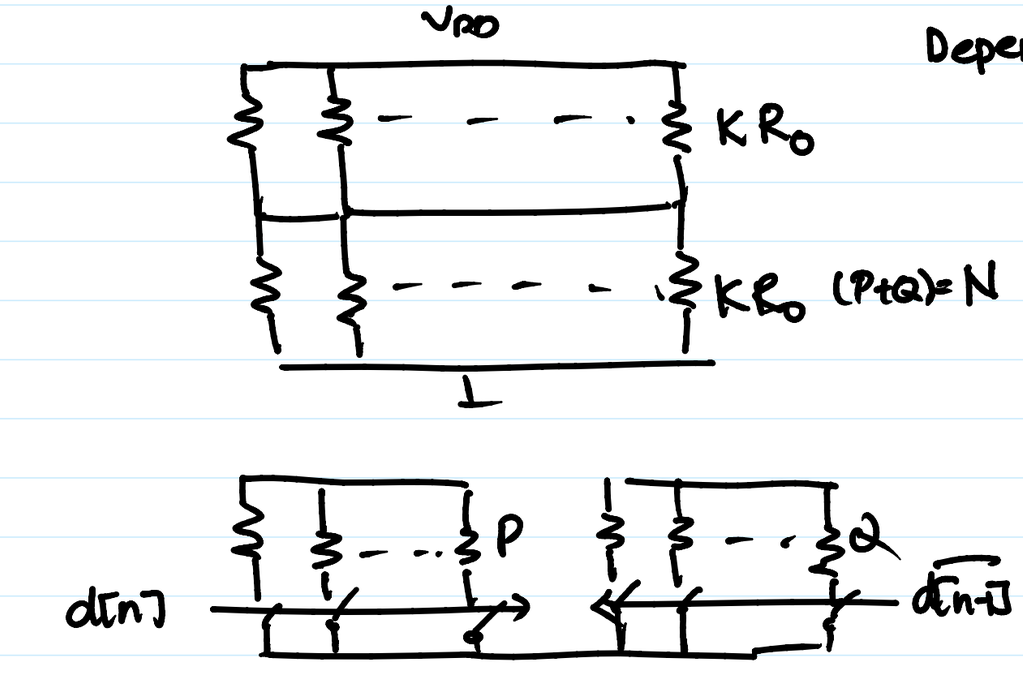




- More current in VM o/p driver w/ equalization
- Switching current

* Switching current

Uniformly Segmented VM o/p driver



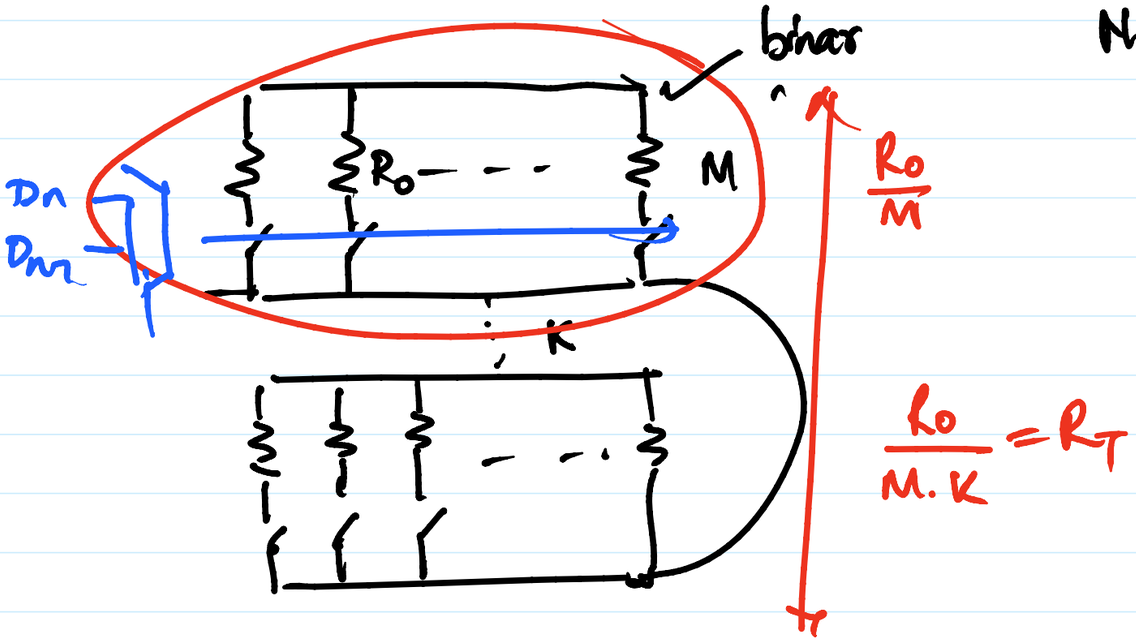
Depending on PVT variations, choose N seg.

$$\frac{KR_0}{N} = R_T$$

For. ex. $N = 16 = P+Q$

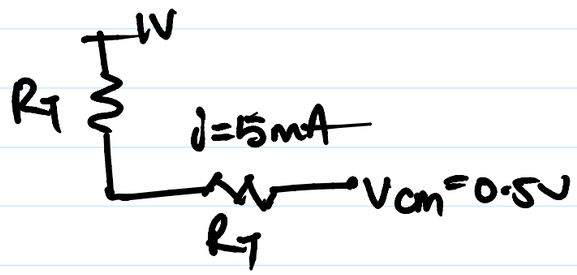
min. $Q = 1$, $P = 15$

$N \rightarrow 14$, min. $Q = 1$, $P = 13$

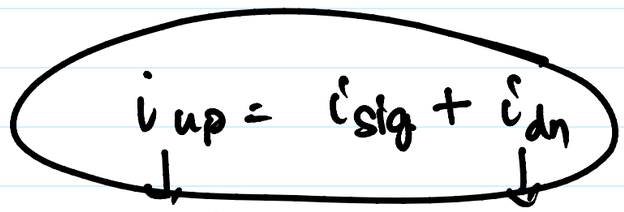


$X (< K)$ s.t. $\frac{R_0}{M.X} = R_T$

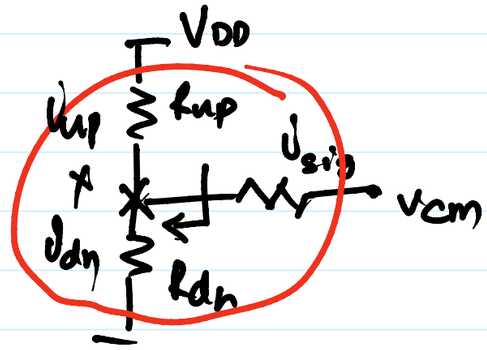
min. Postcursor 1 fM



$$i = \frac{1}{200}$$

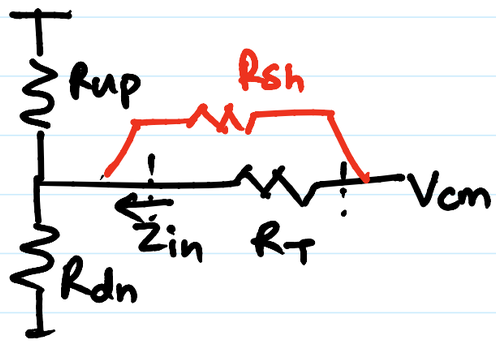


$\Rightarrow R_{up}\uparrow \qquad R_{dn}\uparrow$

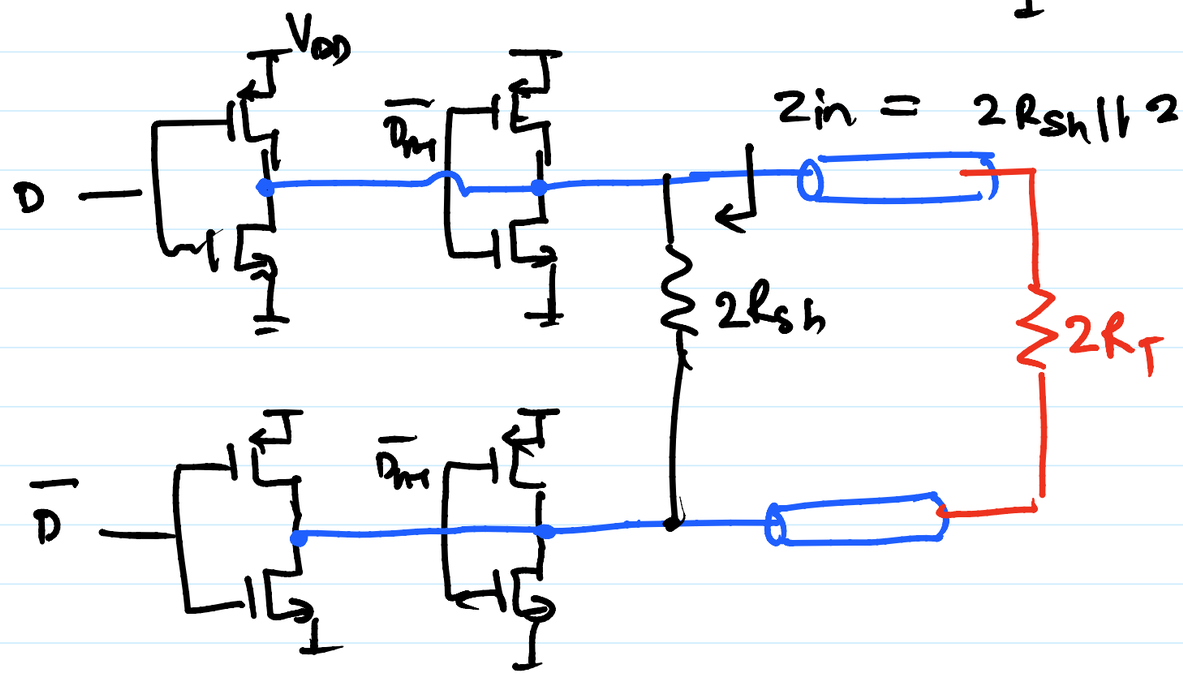


$i_{sig} < 5mA$

Goal – Lower current from supply.
Maintain channel termination.



$Z_{in} = R_{up} // R_{dn} // R_{sh}$



$Z_{in} = 2R_{sh} // 2(R_{up} // R_{dn})$

x Channel term. $\rightarrow \frac{1}{} + \frac{1}{} + \frac{1}{} = \frac{1}{}$

* Channel term. $\Rightarrow \quad \frac{1}{R_{up}} + \frac{1}{R_{dn}} + \frac{1}{R_{sh}} = \frac{1}{R_T}$

* $\frac{dI_{sup}}{dV_{out}} = 0$

* V_{out} depends on equalization