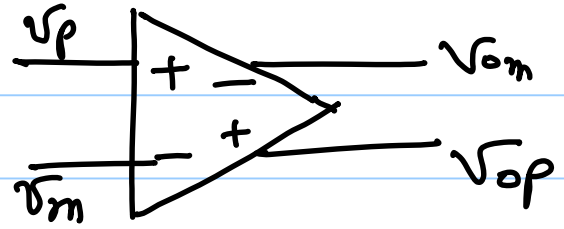
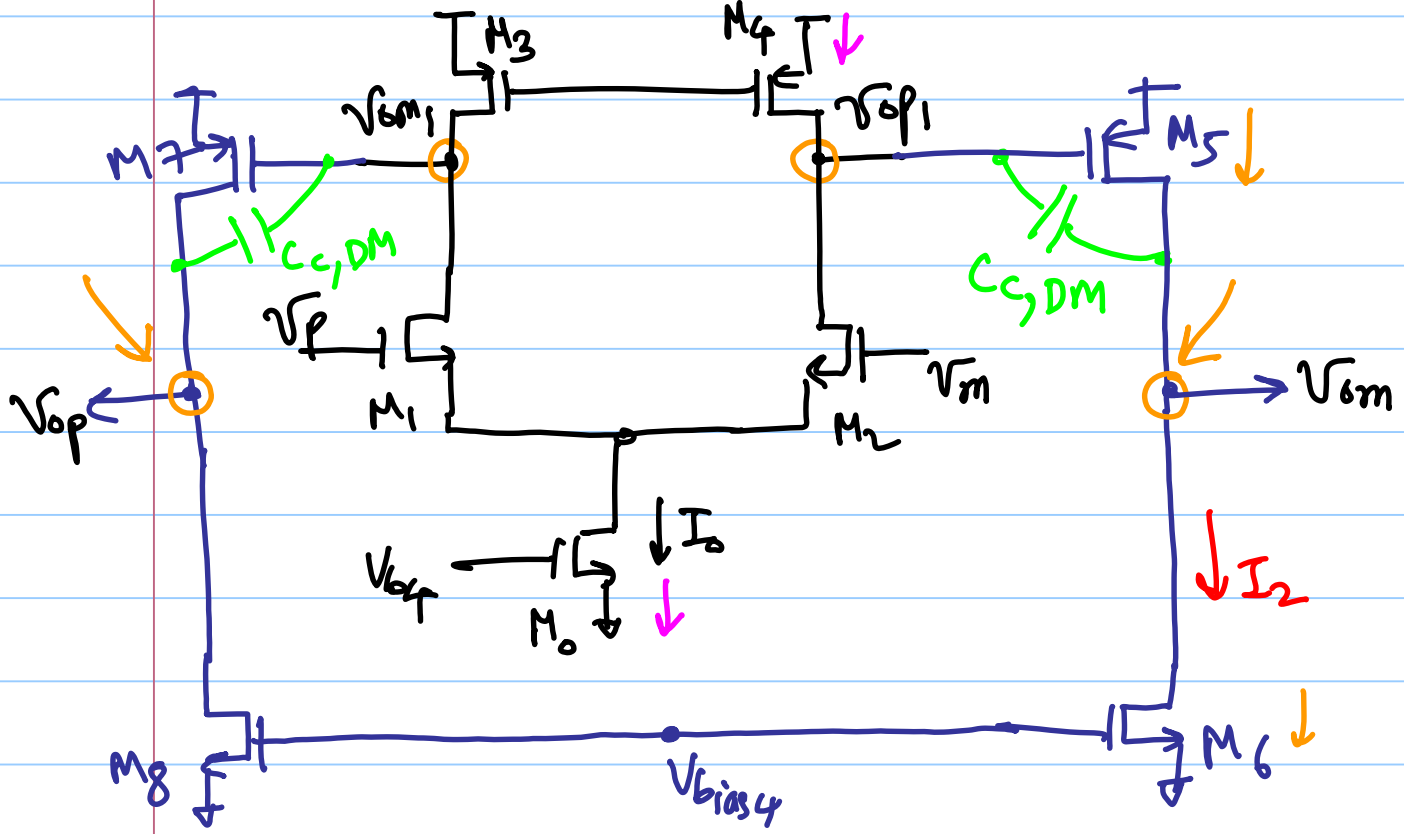
ECE 614 – Lecture 4

Note Title 9/4/2014

* Resistive averaging CM-detector
* dual diff-pair based CM-detector

Two-stage fD opamp





We have Two sources to adjust

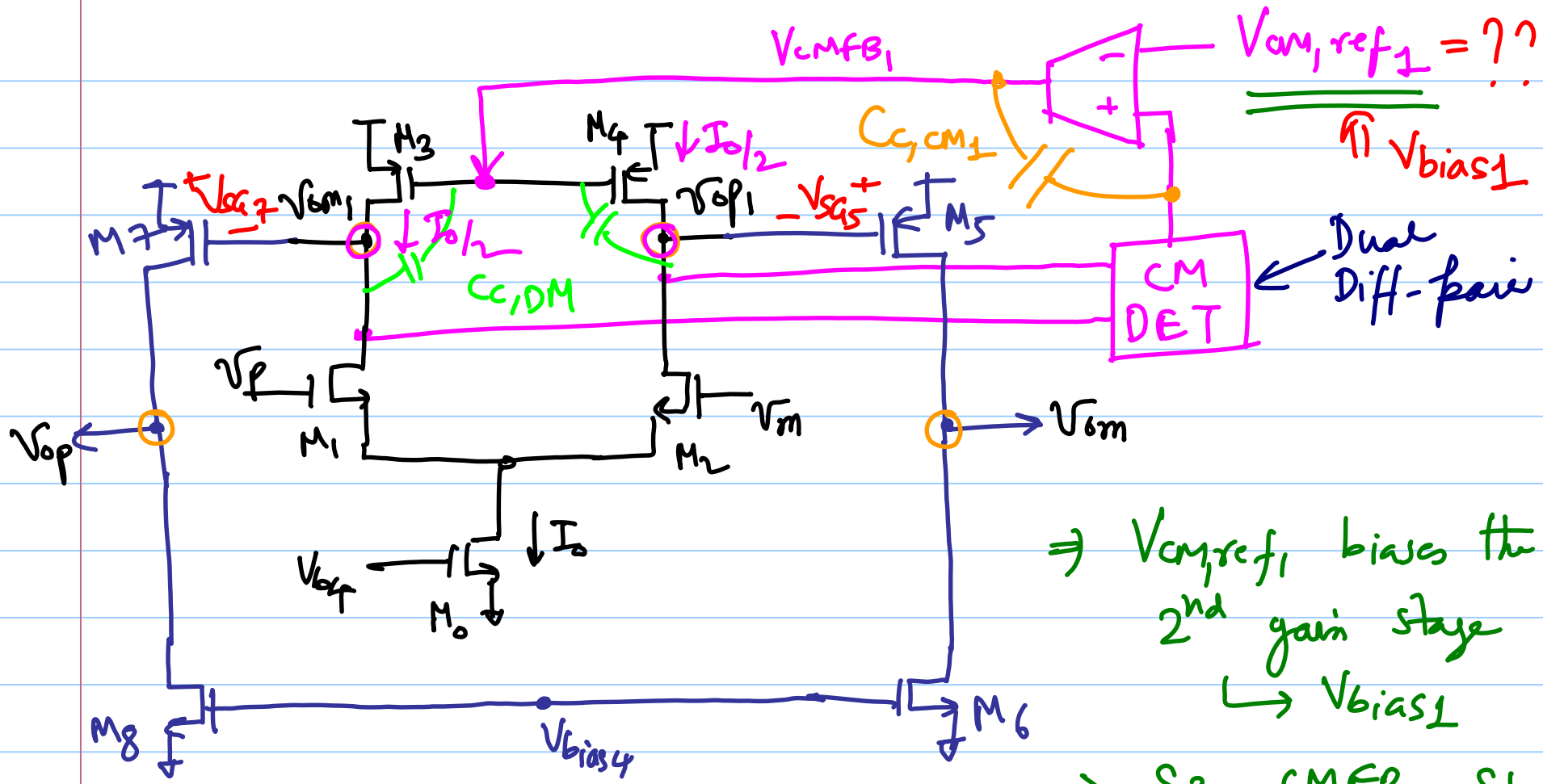
M_3 & M_4 → current equal to $\frac{I_o}{2}$

M_6 & M_8 ↔ current in M_5 & M_7

Two options:

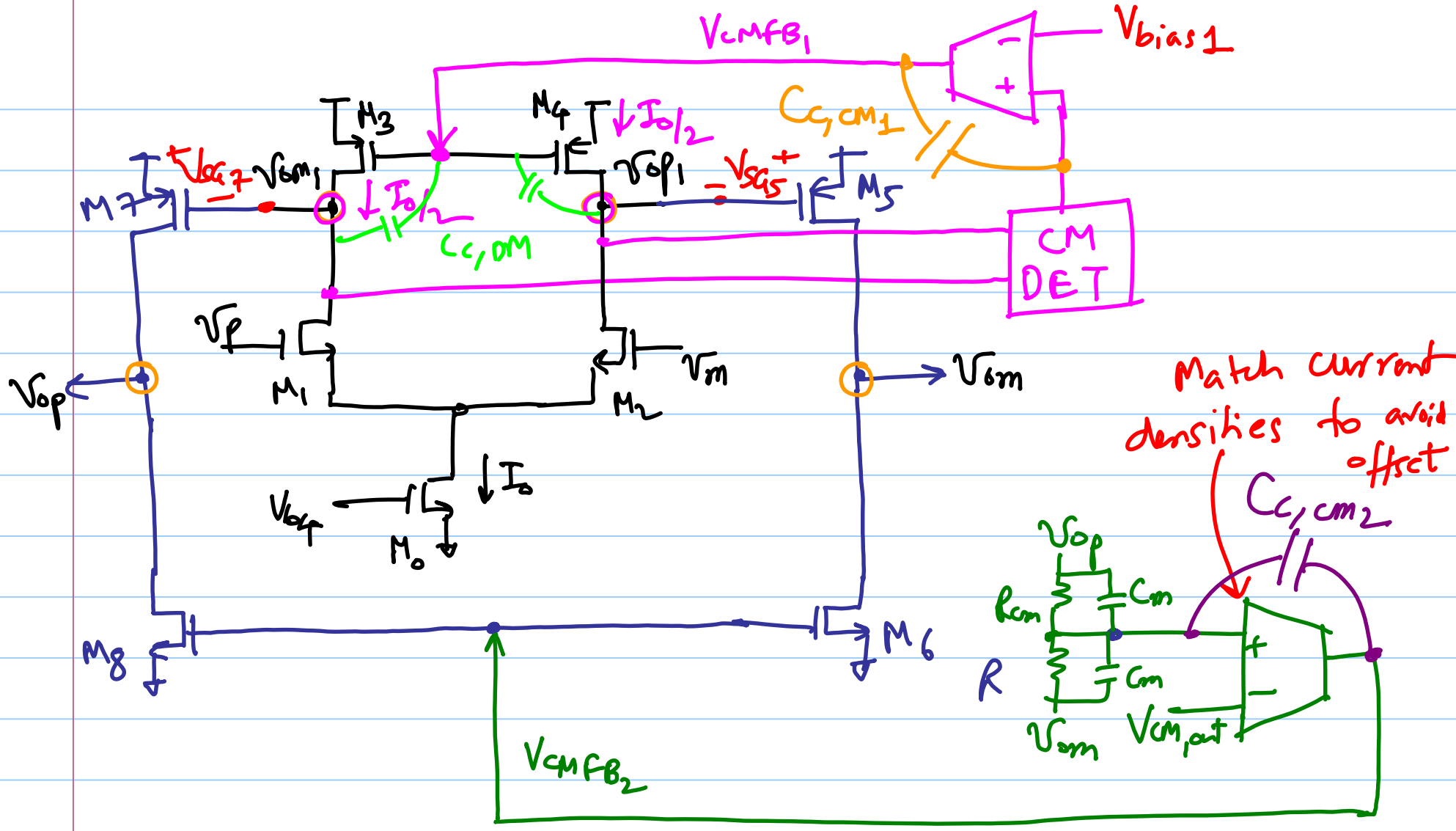
① We use a single point of control

② Two separate CMFB loops for each of these nodes

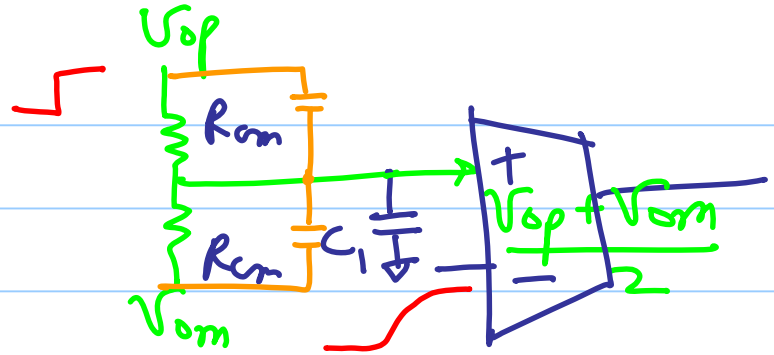


$\Rightarrow$ V_{cm,ref_1} biases the 2nd gain stage
↳ V_{bias1}

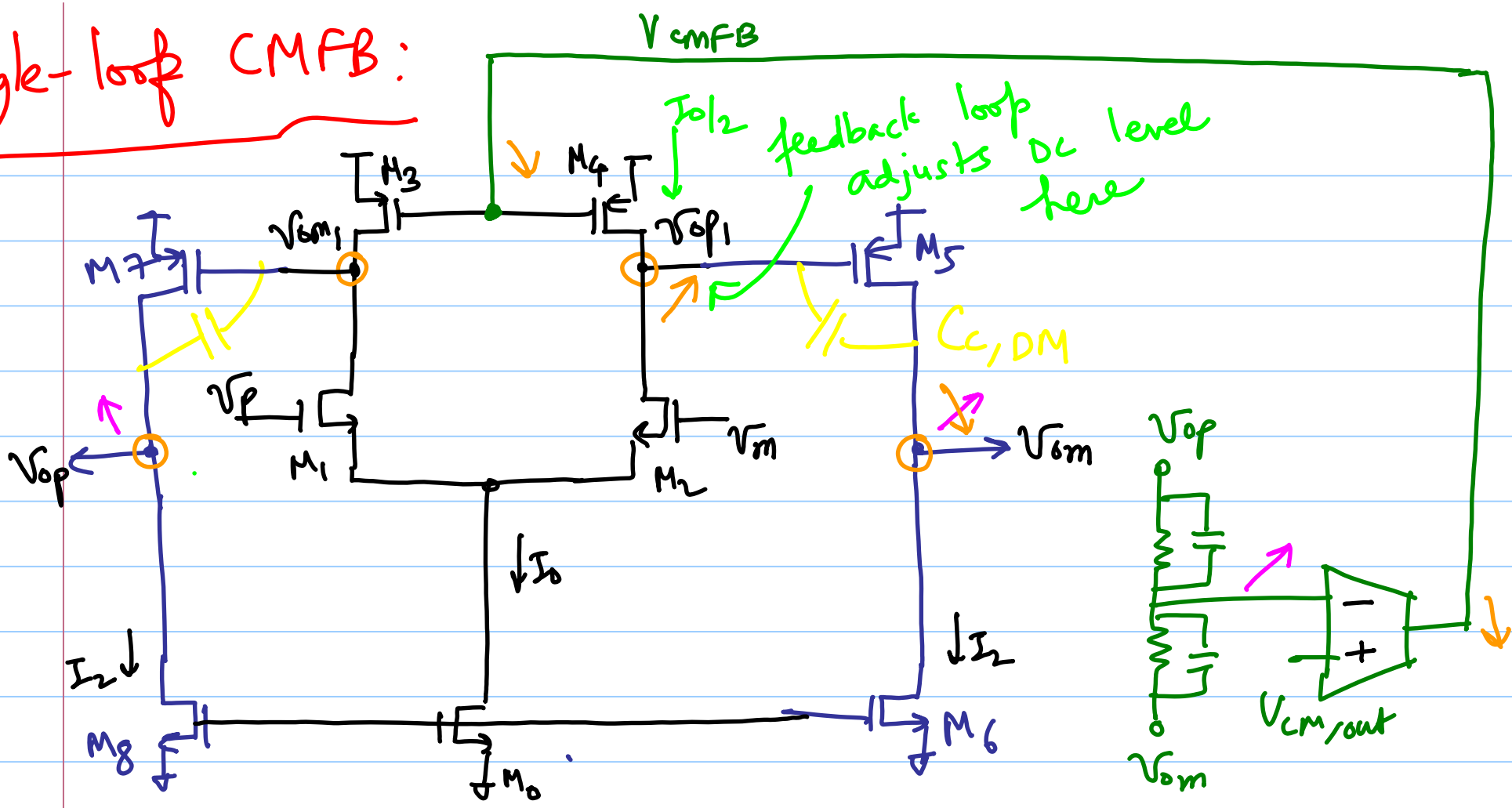
$\Rightarrow$ Size $CMFB_1$ s.t. there is no systematic offset.



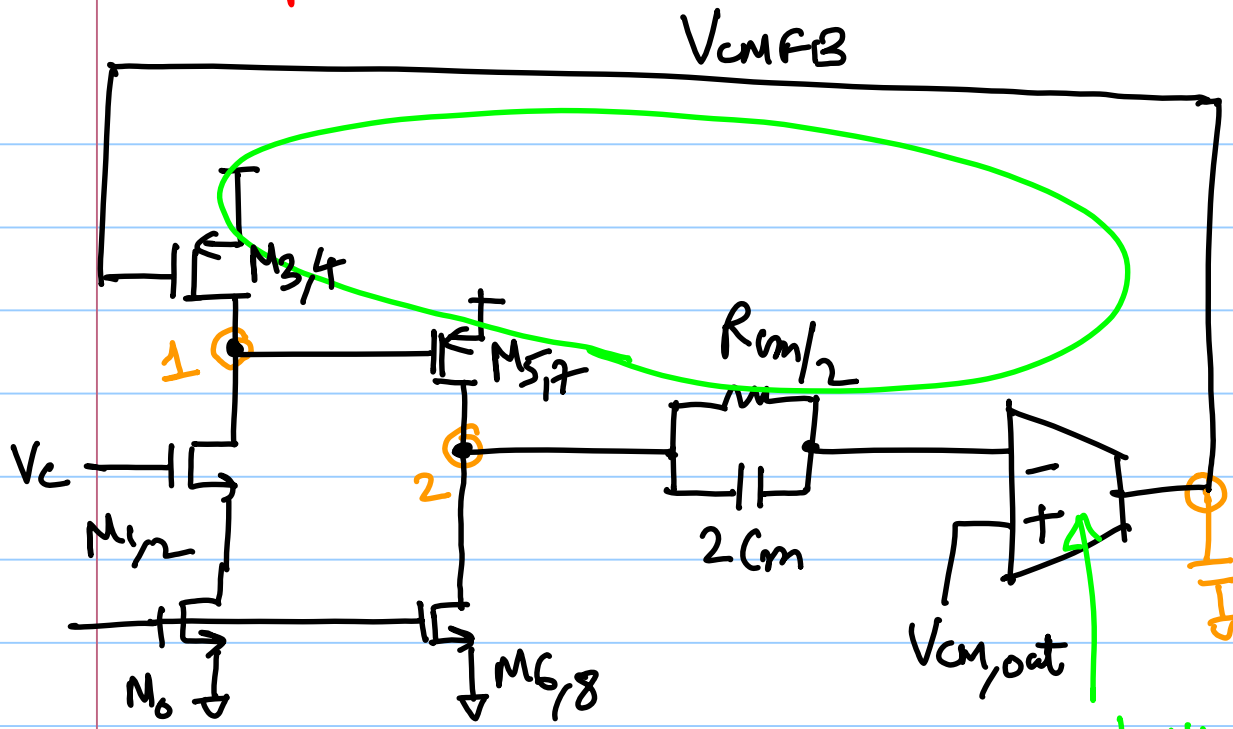
Control M_6 & M_8 s.t the current is equal to $I_{M_5 \& M_7}$


Vop
Rcm
Rcm
C1
Vom
Vop + Vom
2

Single-loop CMFB:



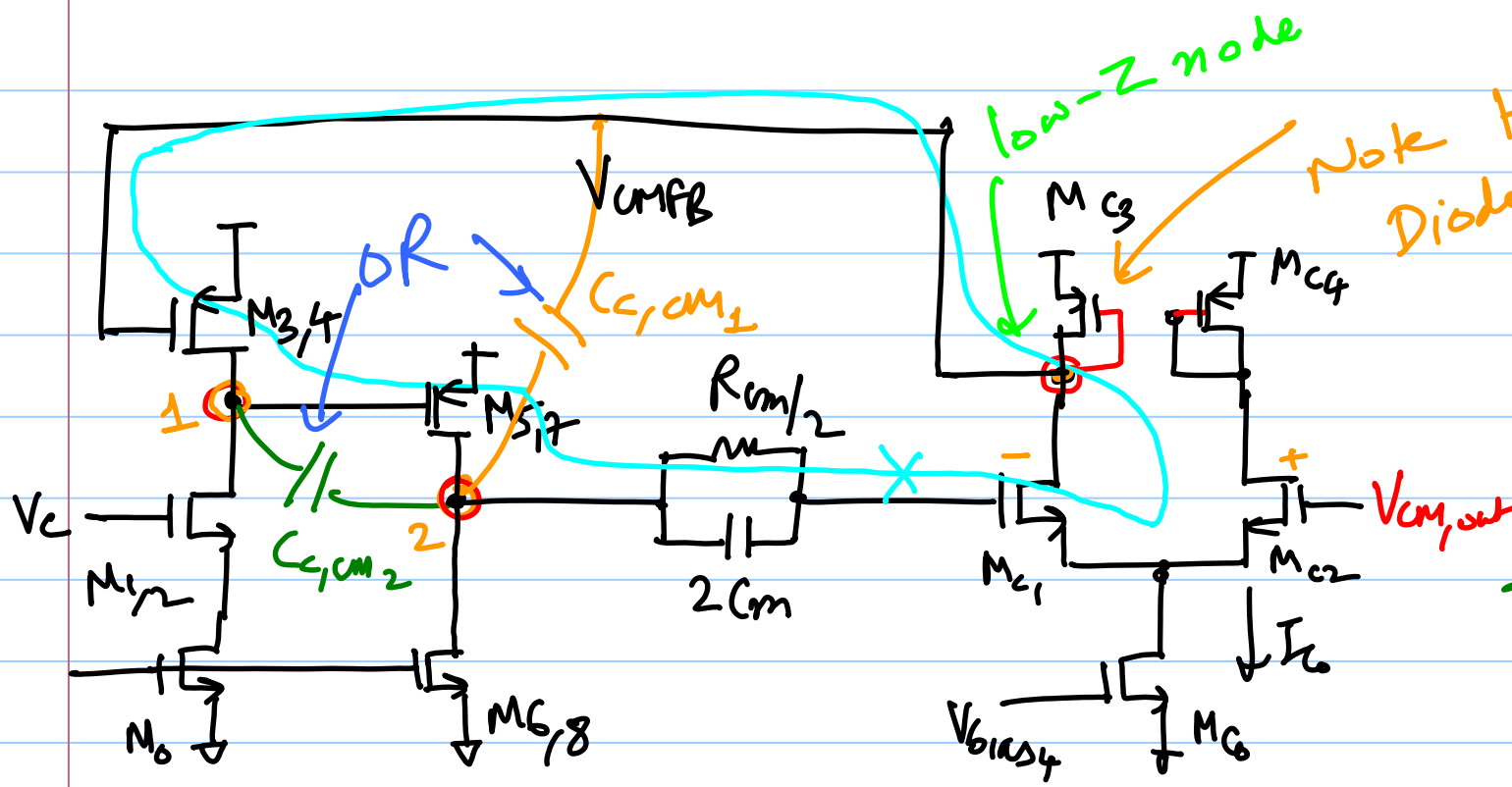
CM picture



* 3 low-frequency poles
  - ↳ complex compensation

* How to get rid of this 3-pole situation

Kill the gain of this error Amp??



$$g_c = -\frac{1}{2}\left(\frac{g_{mc_1}}{g_{mc_3}}\right) \leq -1$$

* Can use the differential path C_c for compensating the CMFB loop itself.