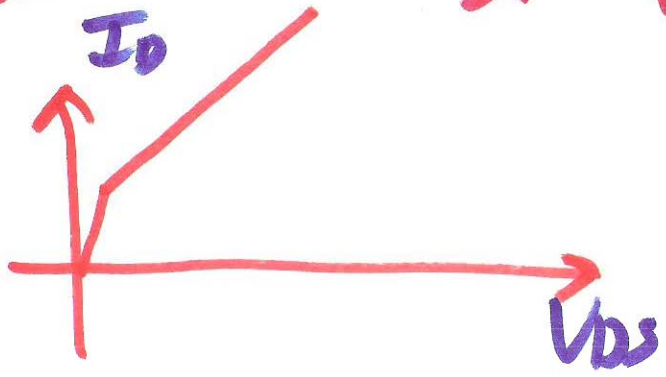
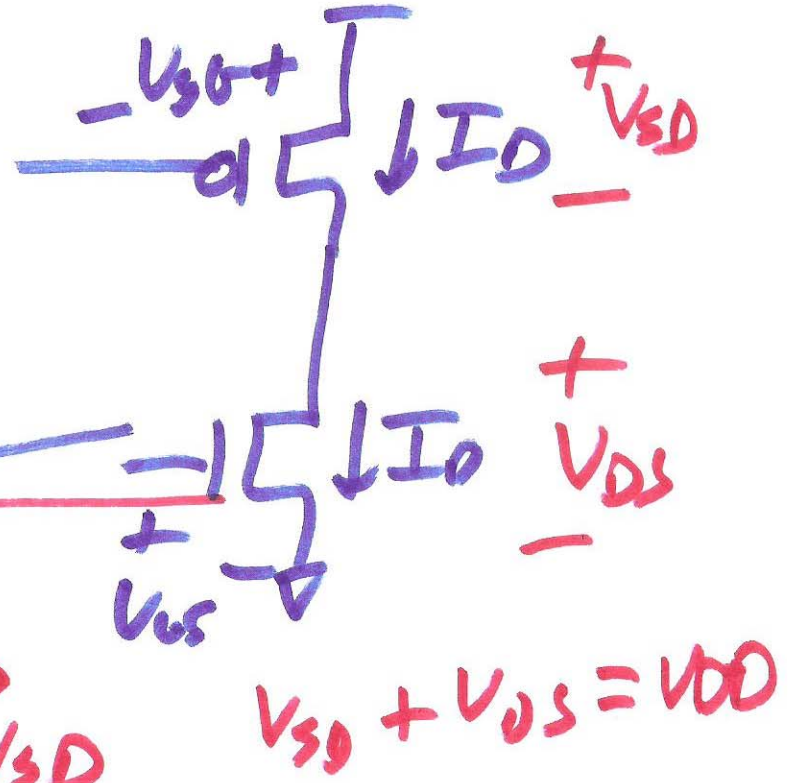
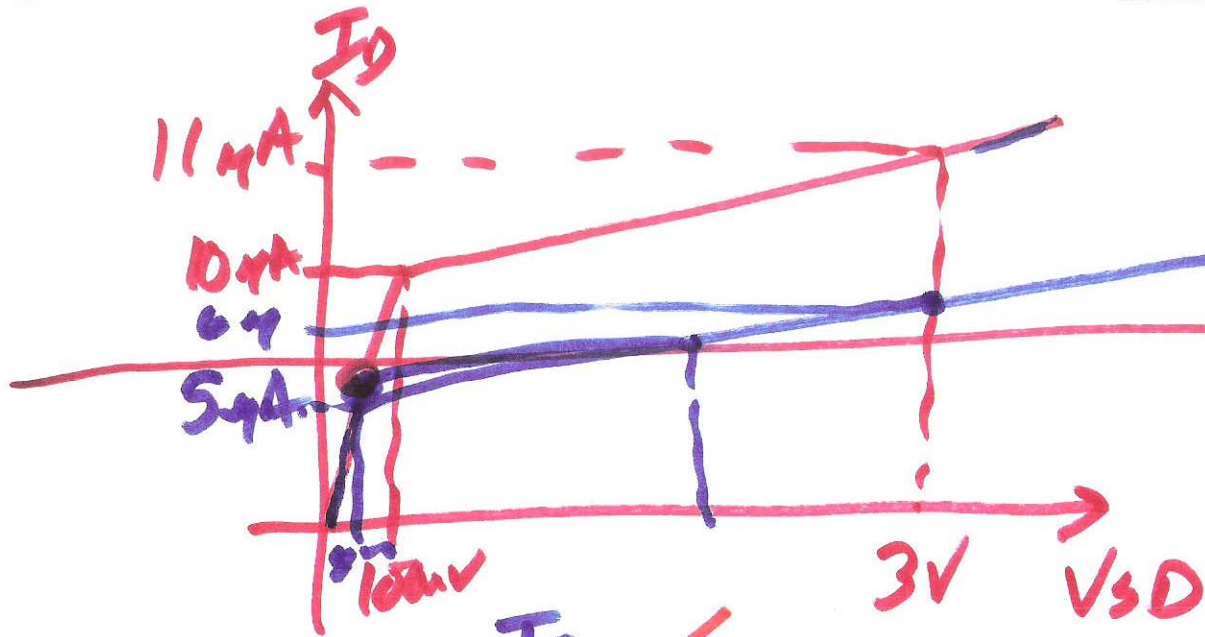
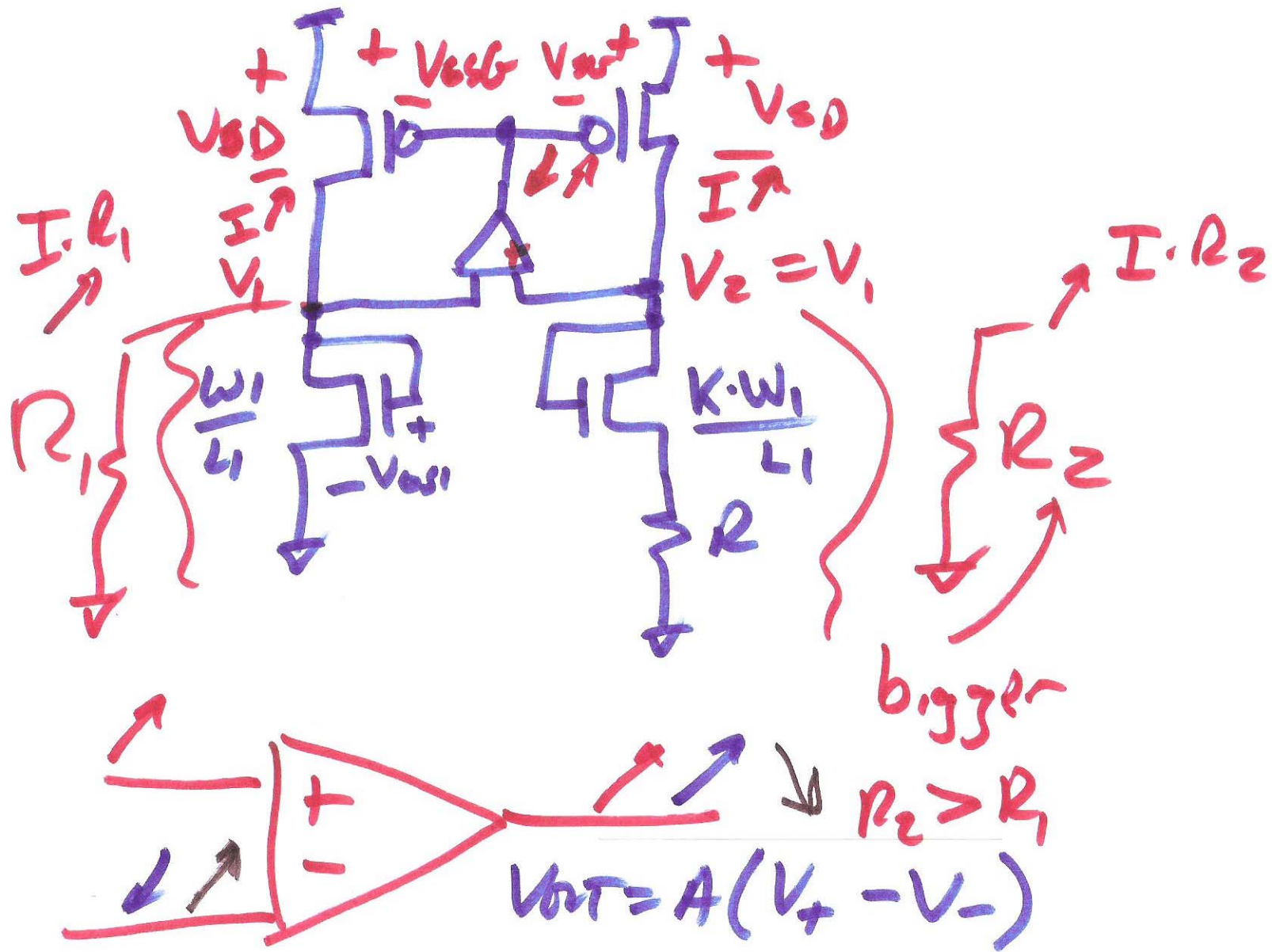
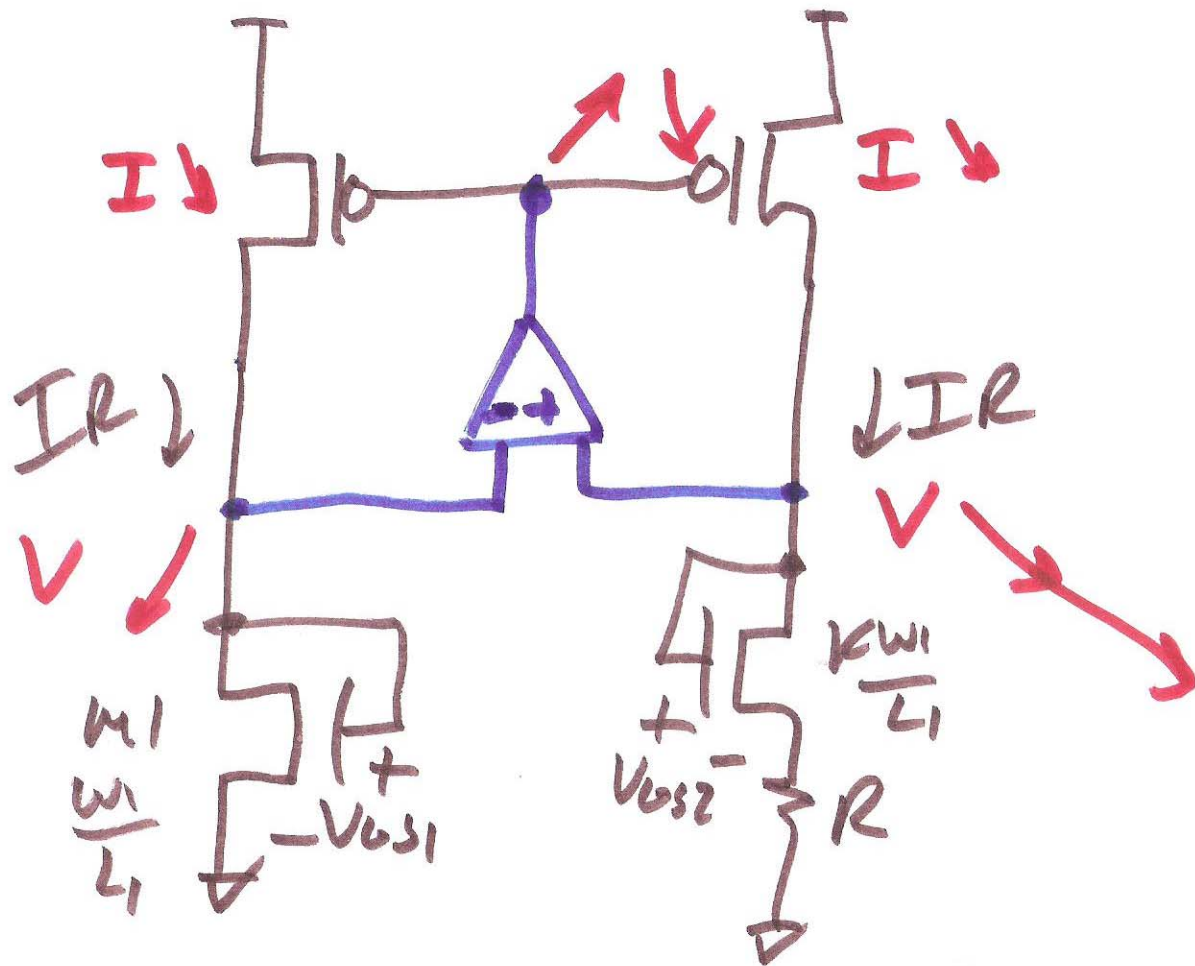


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Problem A20.6

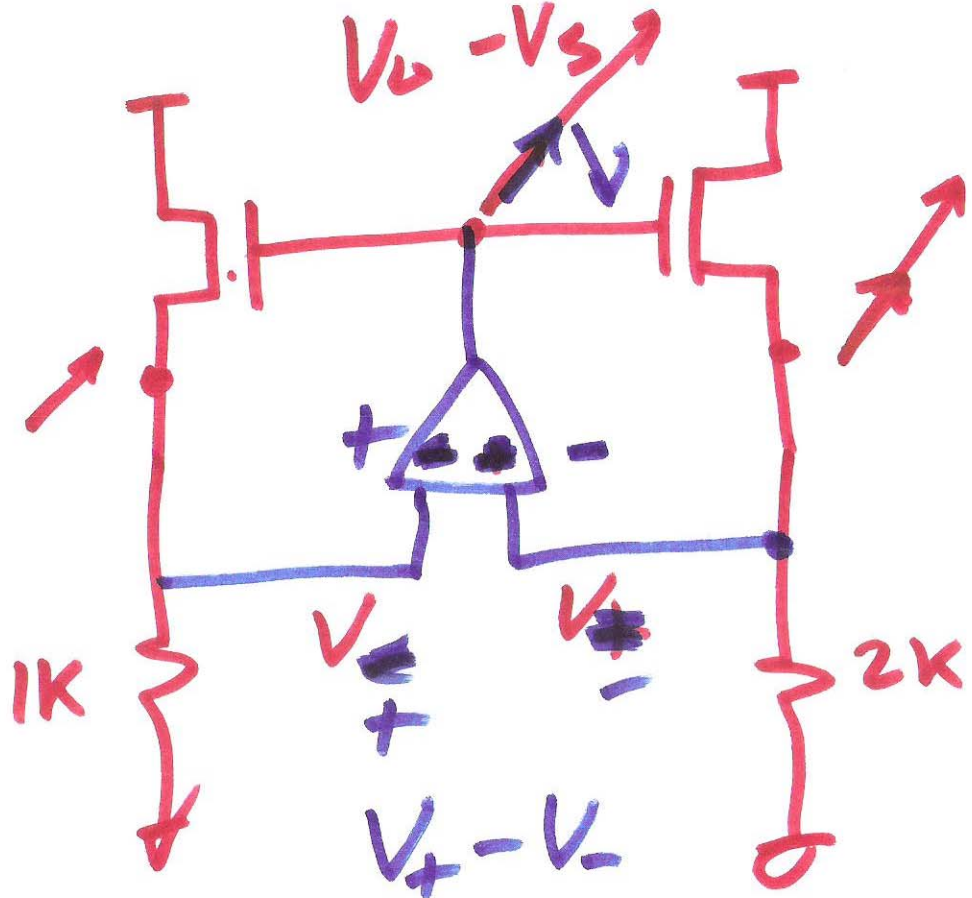




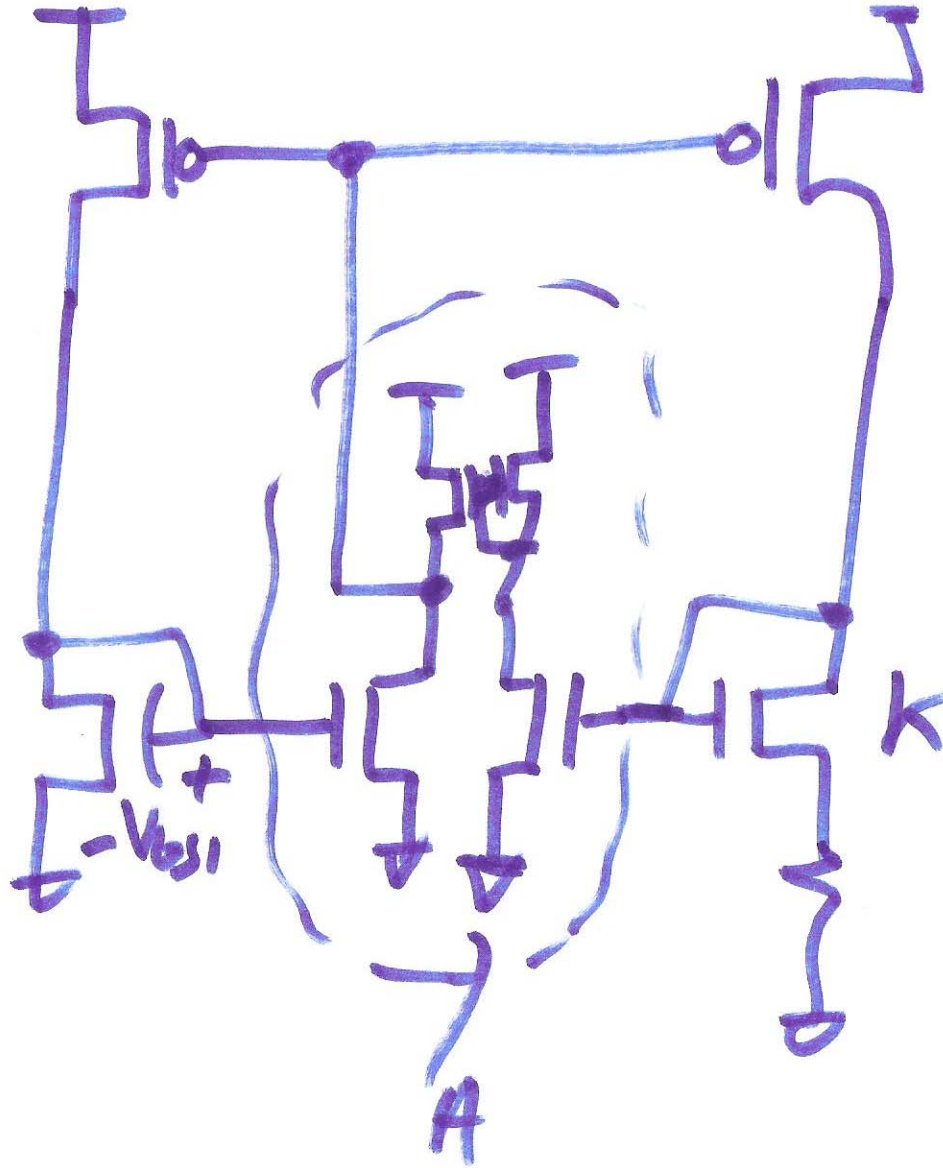


$$V_{bs1} = V_{bs2} + I \cdot R$$

3)



4)

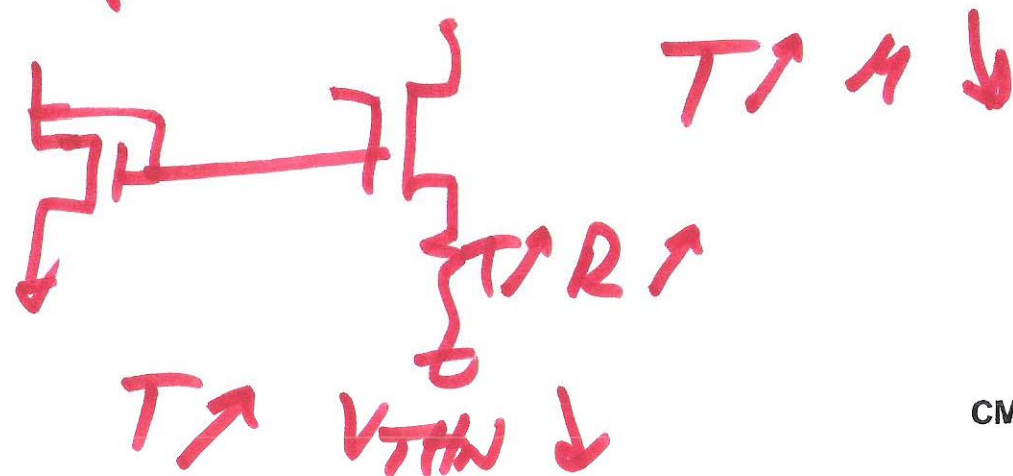


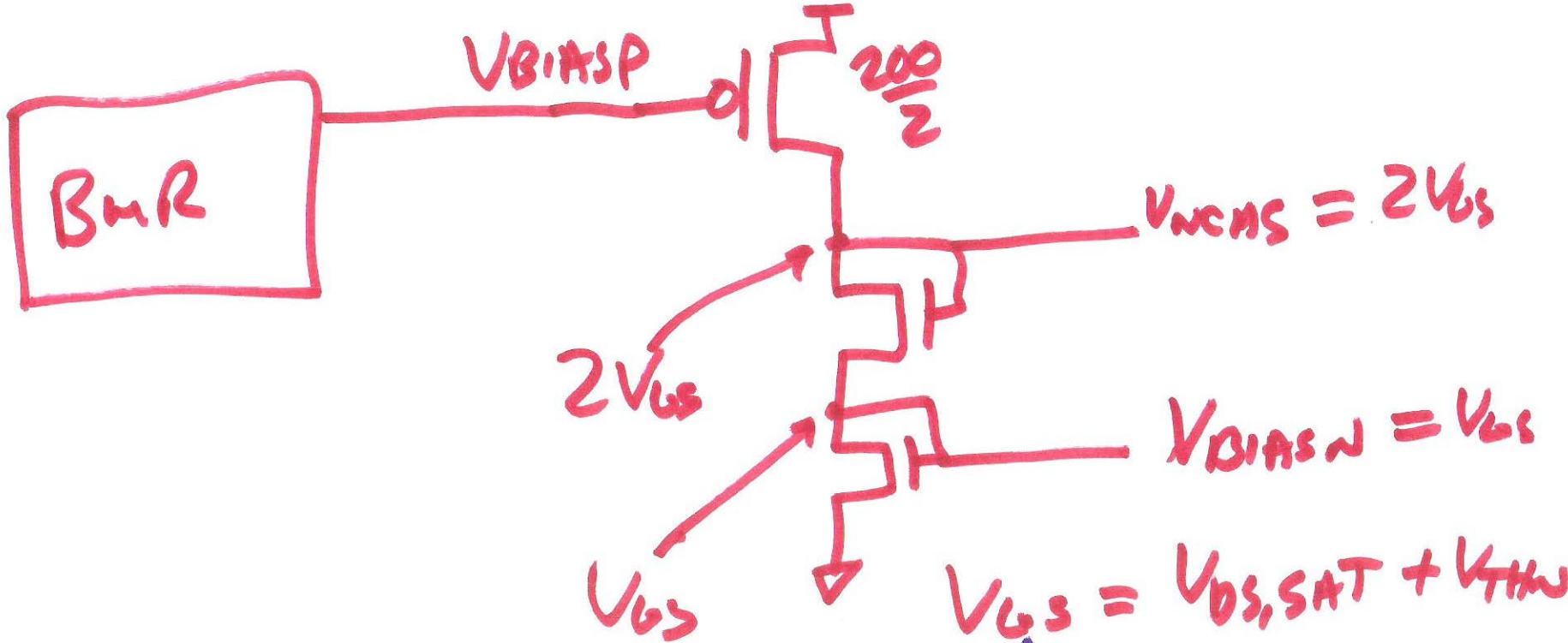
$$\frac{4 \cdot 10^{-4} \text{ A} \cdot 1 \text{ V}}{\text{power}}$$

5)

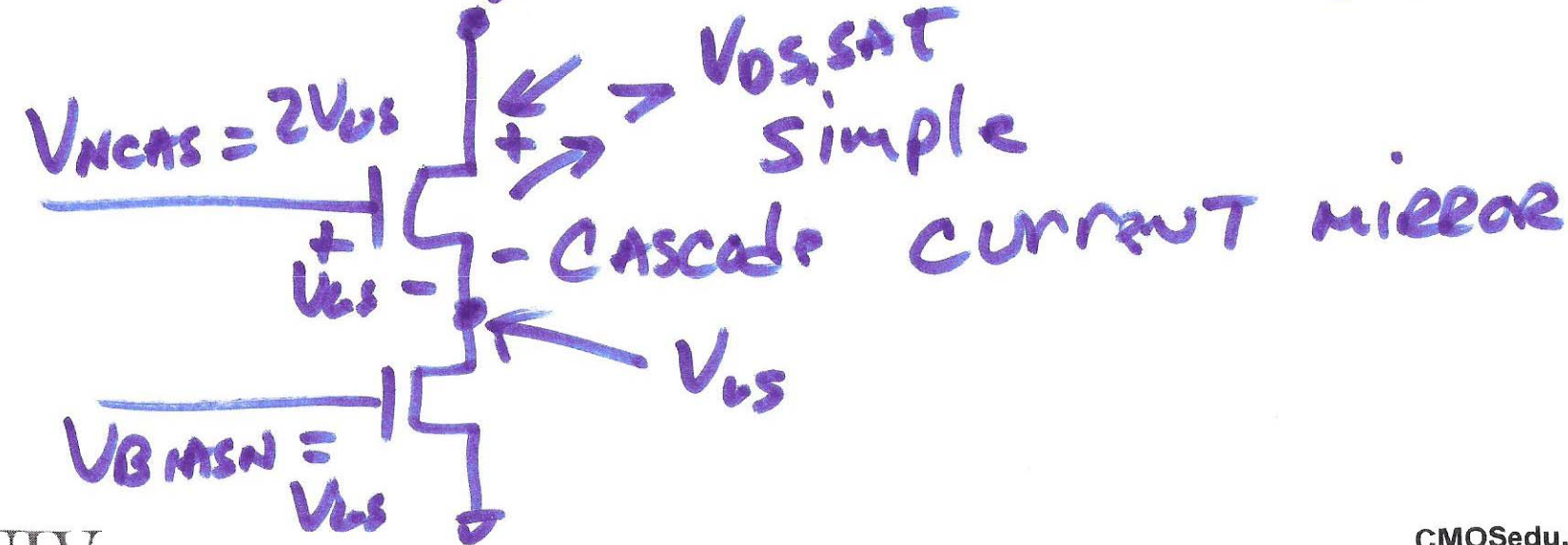
What is the point of the
BMR?

- 1) provide a current reference that doesn't change with VDD.
- 2) set $V_{OVN,P} (= V_{GS} - V_{THN})$ for w, L, g, μ
- 3) reference that is stable with temp and process shifts

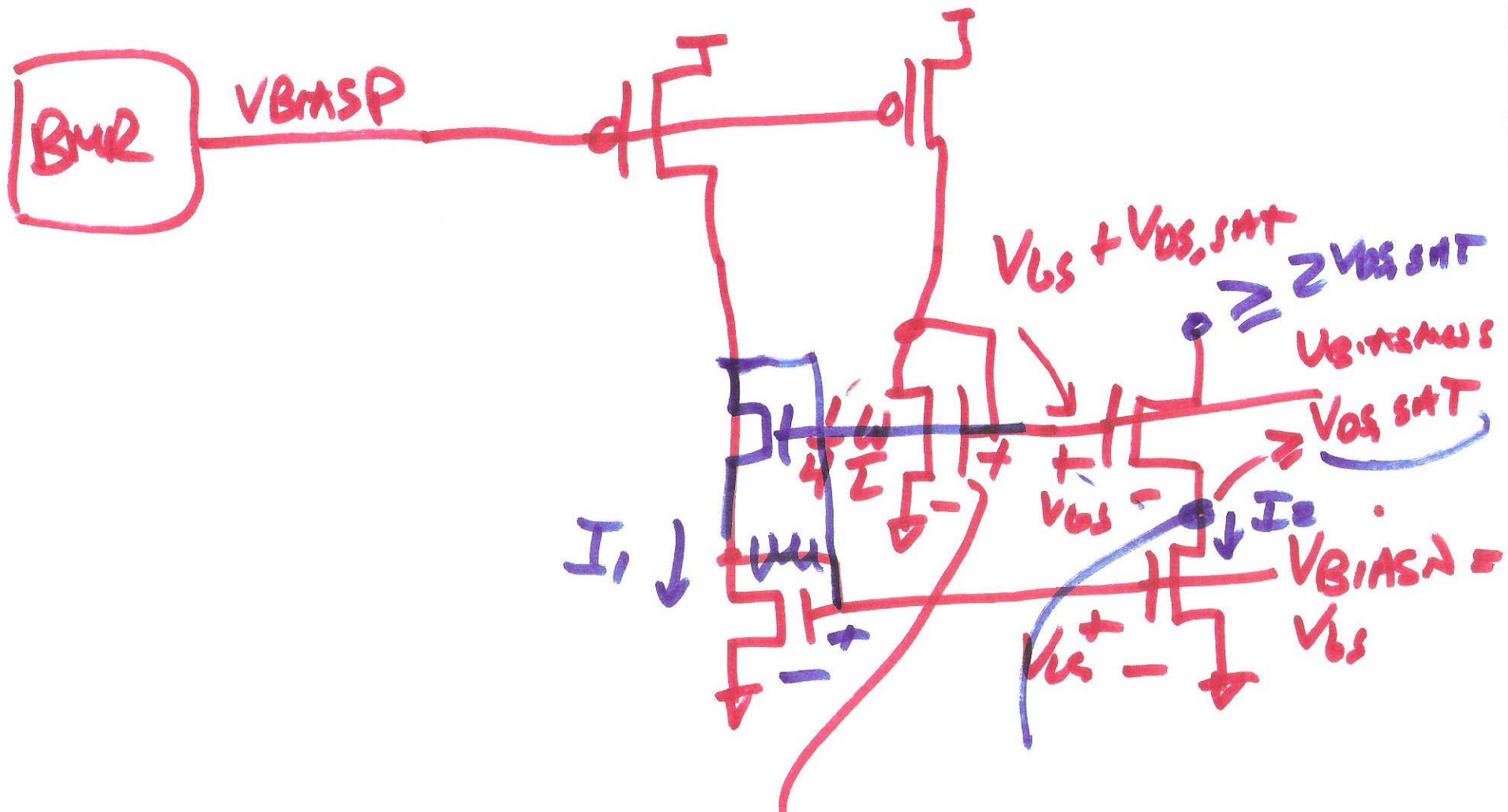




$$V_{OS,SAT} + V_{CS} = 2V_{OS,SAT} + V_{THN}$$



7)



$$V_{GS} + V_{DS,SAT} = 2V_{GS,SAT} + V_{thn}$$

$$\frac{1}{4L} \cdot \underbrace{(2V_{GS,SAT} + V_{thn} - V_{thn})^2}_{V_{GS,MWS}}$$

8)