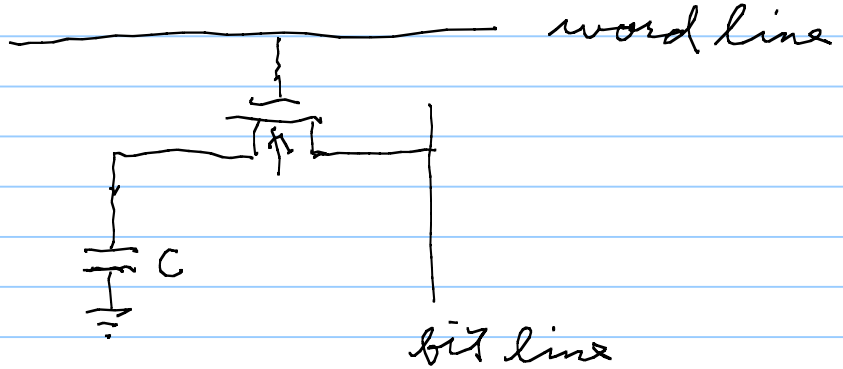
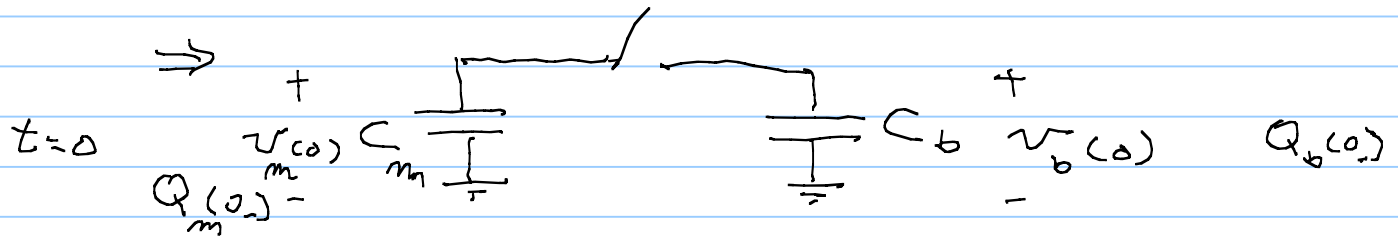
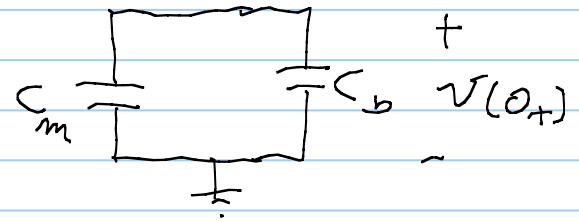
EE303H
10/23/14

Note Title 10/16/2014

Dynamic RAM p. 1225







$$Q(0_+) \simeq Q_m(0_-) + Q_b(0_-)$$

$$C = C_m + C_b$$

$$(C_m + C_b)\, v(0_+) \simeq Q_m(0_-) + Q_b(0_-) = C_m v_m(0_-) + C_b v_b(0_-)$$

if C_m stores a 1 then $v_m(0_-) = V_{DD}$ & $v_b(0_-) = \frac{V_{DD}}{2}$ by precharge

$$(C_m + C_b)\, v(0_+) \simeq C_m \cdot V_{DD} + C_b \frac{V_{DD}}{2} \Rightarrow v(0_+) \simeq \frac{(C_m + C_b/2)}{(C_m + C_b)} \cdot V_{DD}$$

$$\simeq \frac{2C_m + C_b}{C_m + C_b} \cdot \frac{V_{DD}}{2}$$

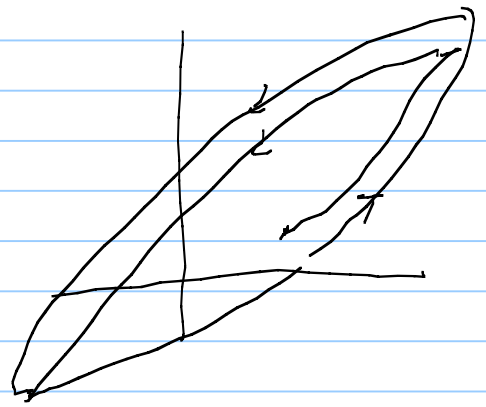
will have $V_{DD}/2 + \Delta_1 V_{DD} = v(0_+)$

if C_m stores a zero then $v(0+) = \frac{0 \cdot C_m + C_b}{C_m + C_b} \frac{V_{DD}}{2}$

will have $\frac{V_{DD}}{2} - \Delta_0 V_{DD} = v(0+)$

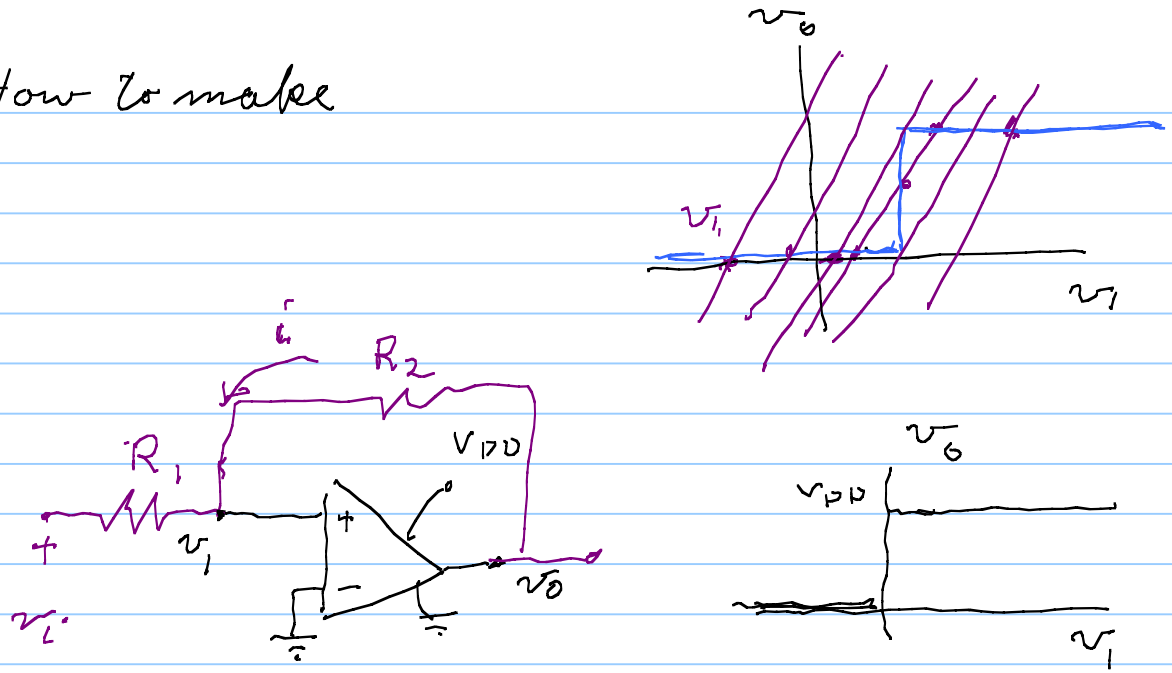
Hysteresis

electronic



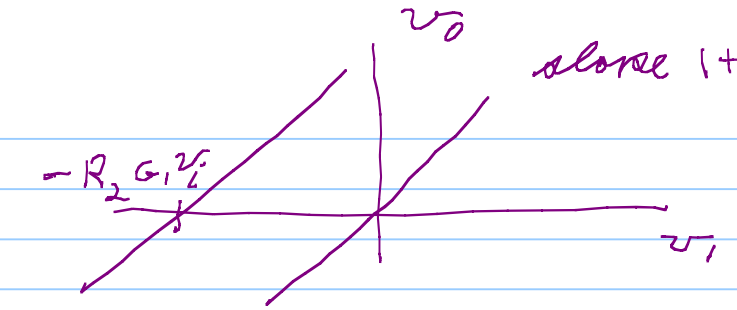
magnetic

How to make

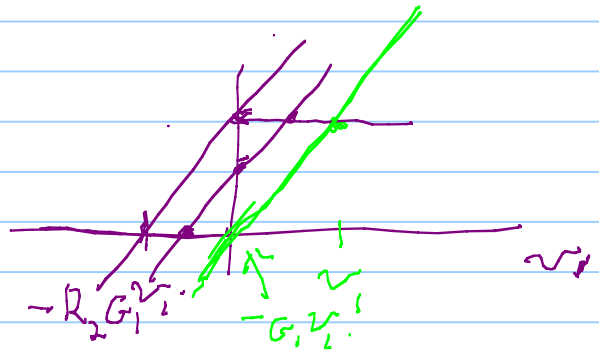


$$v_o = R_2 i + v_1 \quad , \quad v_1 - v_i = R_1 i \Rightarrow i = G_1 (v_1 - v_i)$$

$$v_o = R_2 G_1 v_1 + v_1 - R_2 G_1 v_i = (1 + R_2 G_1) v_1 - R_2 G_1 v_i$$



→ moves right if decrease v_i



find v_i such that $v_o = V_{DD}$ @ $v_i = 0 \Rightarrow V_{DD} = -R_2G_1v_i \Rightarrow v_i = \frac{-V_{DD}}{R_2G_1}$