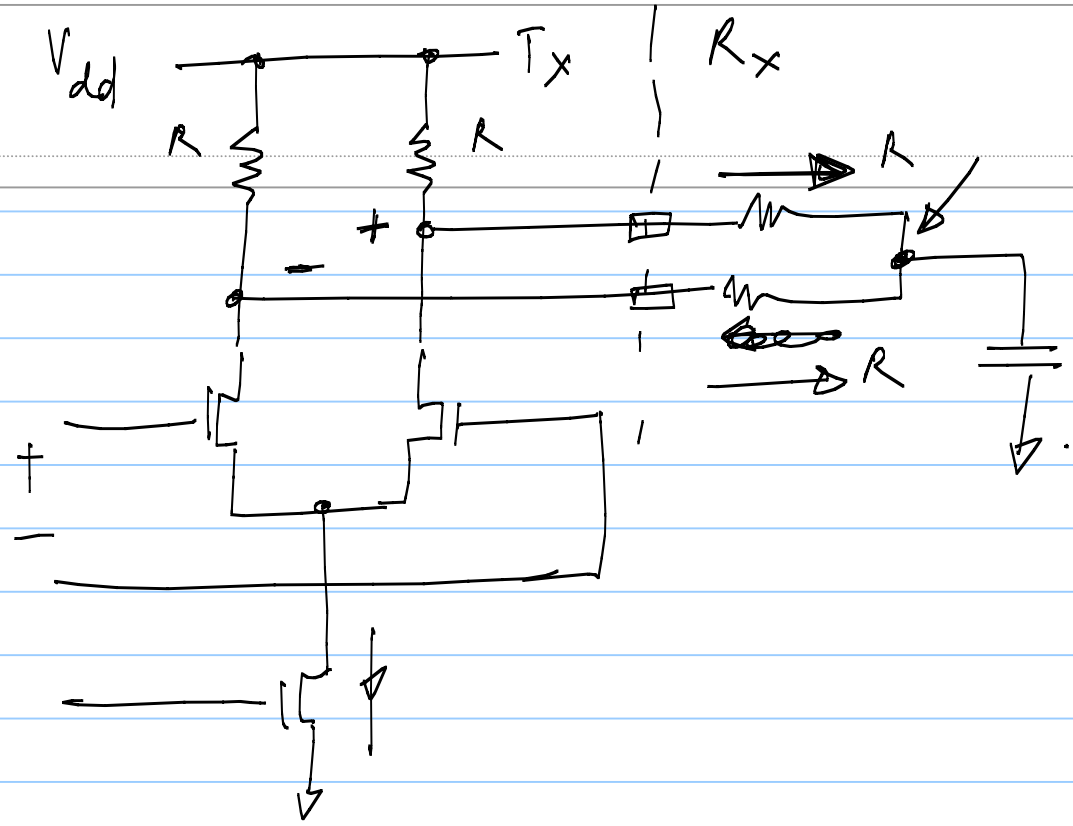
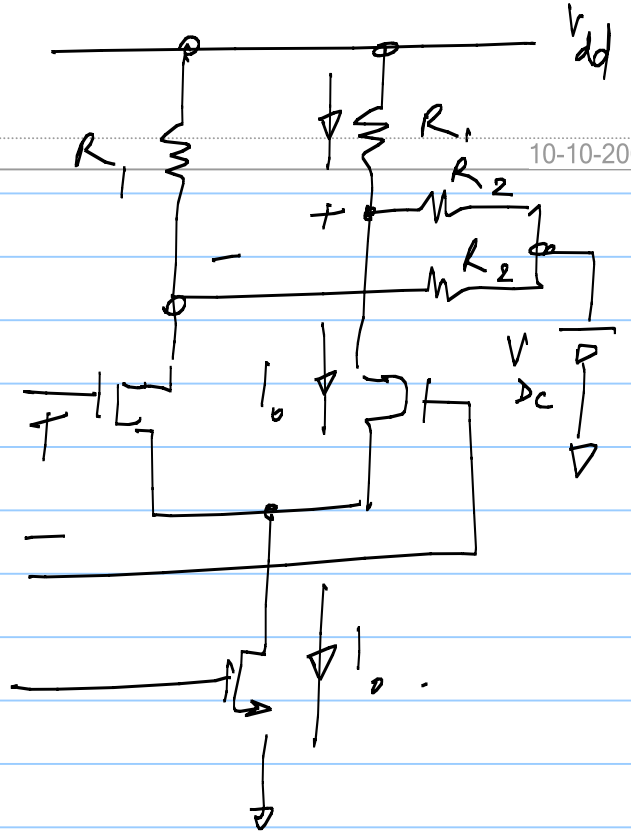
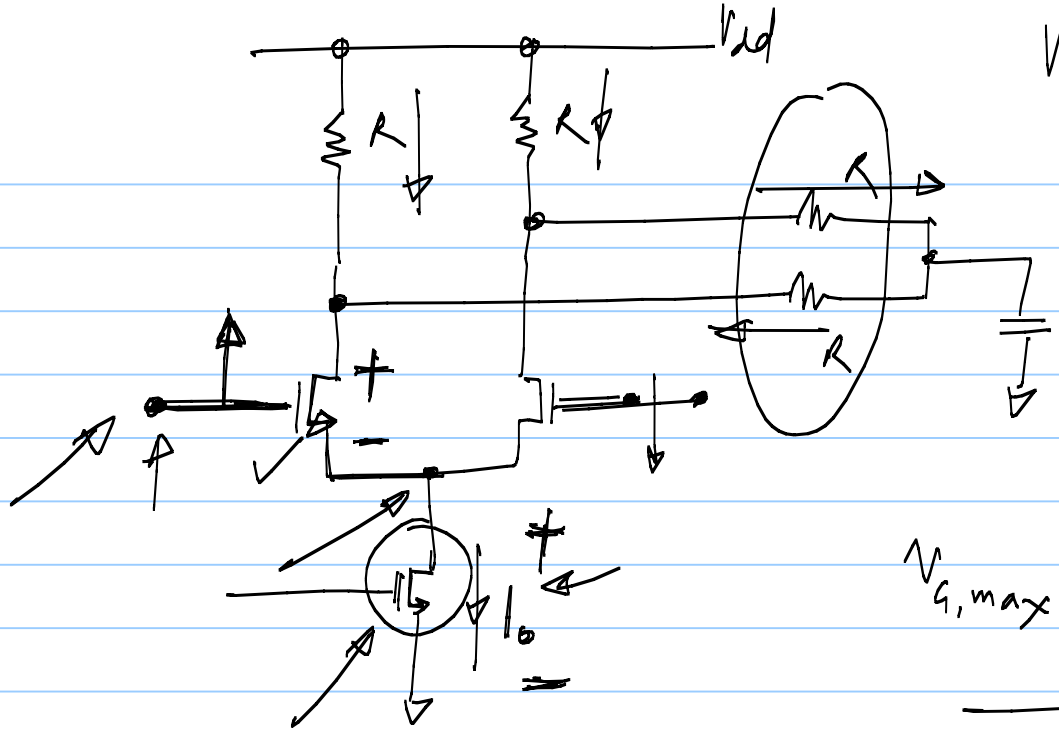
Note Title 10-10-2007





$$I_0 = \frac{V_{dd} - V_{o,cm}}{R}$$

$$I_0 = \frac{V_{dd} - V_{o,cm}}{R_1} + \frac{V_{DC} - V_{o,cm}}{R_2}$$



$$V_{o,cm} = \left(V_{dd} - \frac{I_0 R}{2}\right) - \frac{I_0 R}{4}$$

$$V_{o,min} = \left(V_{dd} - \frac{3 I_0 R}{4}\right)$$

$$V_{G,max} = V_{dd} - \frac{3 I_0 R}{4} + V_T$$

$$= V_{i,cm} + \frac{V_{in,ppd}}{4}$$

Tail source: min V_{DS} @ zero diff. input

$$\left[V_{G,max} - V_T - \sqrt{\frac{2 I_0}{\mu C_{ox} W/L}}\right]$$

$$V_{i,cm} = |V_{DSAT}| + |V_{DSAT}| + V_T = (0.9V)$$

tail — 200mV

Diff. pair — $I_0/2$ — 200mV

V_T — 500mV

Switching voltage = $\sqrt{2} \cdot |V_{DSAT}| = 280mV$

diff. voltage → $600mV_{ppd}$

Diff pair — $I_0/2$ — ~~V_{DSAT}~~ 200mV

$V_{o,max} = 1.05V = 0.55V = V_{DD} - \frac{3I_0}{4}R$

$1.8V$

Diff pp. o/p swing = $I_0R = \frac{5}{3}V = 1.67V$

$I_o R =$ 1.5 V_{pp} differential o/p. 32mA × 50Ω = (1.6 V ppd)

I_o = 30mA ⟵ $\frac{W}{L}$ (−0.25), (1)(0.5), 0.25

$\left(\frac{320\mu}{0.18\mu}\right)$ (16) ⟵ 32mA (0.5)

$\frac{W}{L}$ tail (0.25) − (4mA, 0.25) ~~15mA, 7.5mA~~ + [16mA, (8mA), 4mA

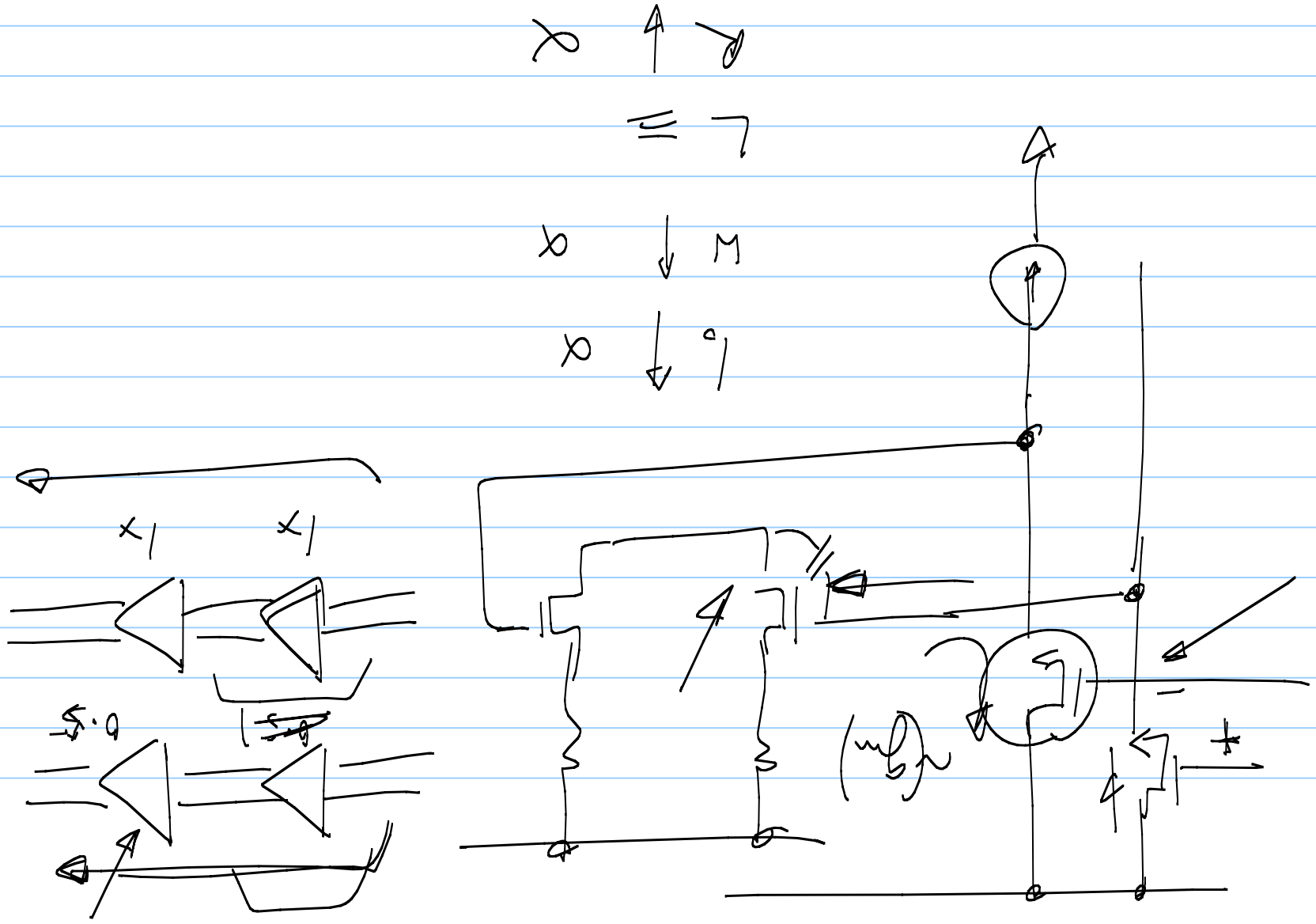
x[n+1] x[n] x[n-1] x[n-2]

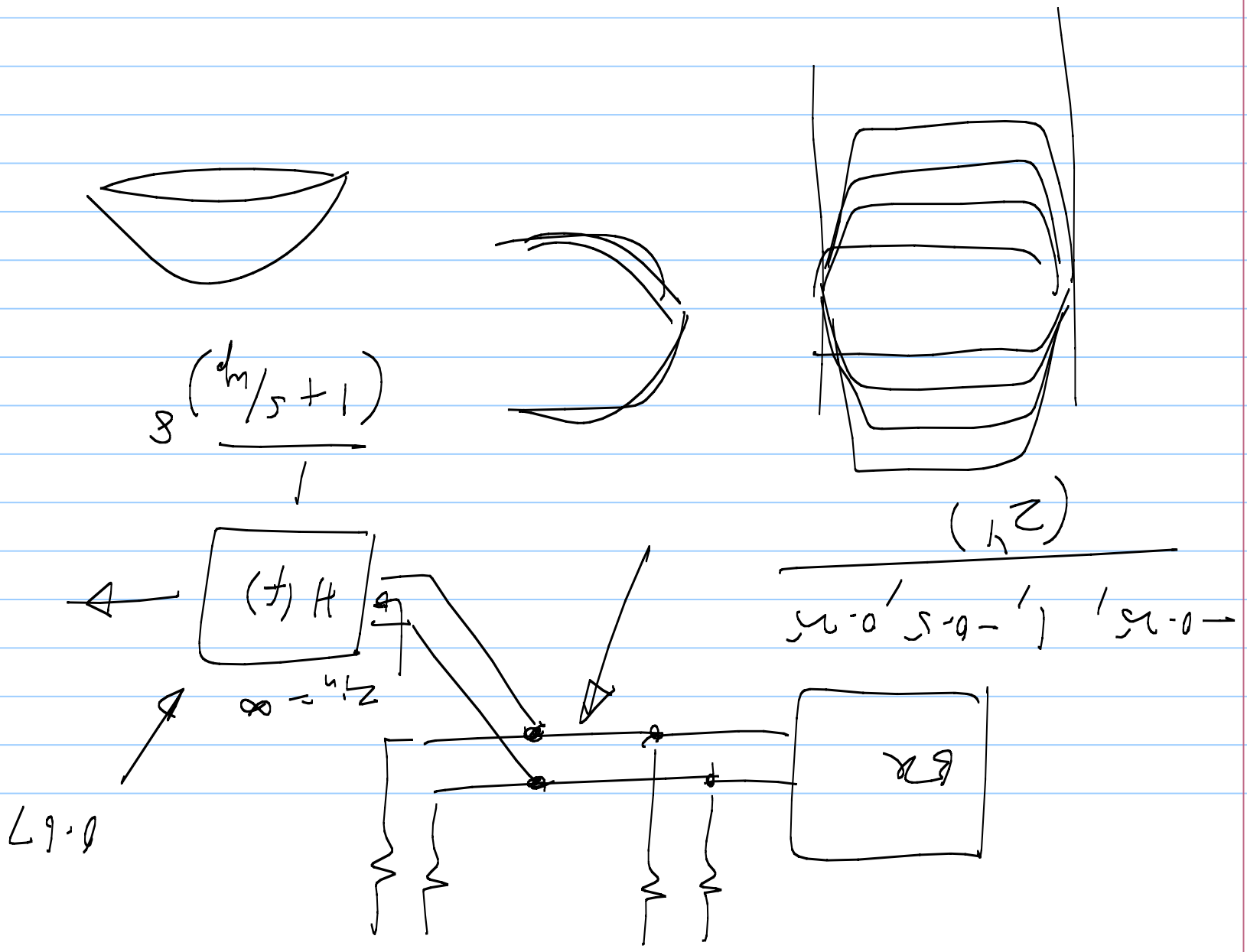
x[n]: −1, 1, −1, 1

4mA 16mA 8mA 4mA

40µ / 0.18 160µ / 0.18 80µ / 0.18 40µ / 0.18

0.1





PAM 4