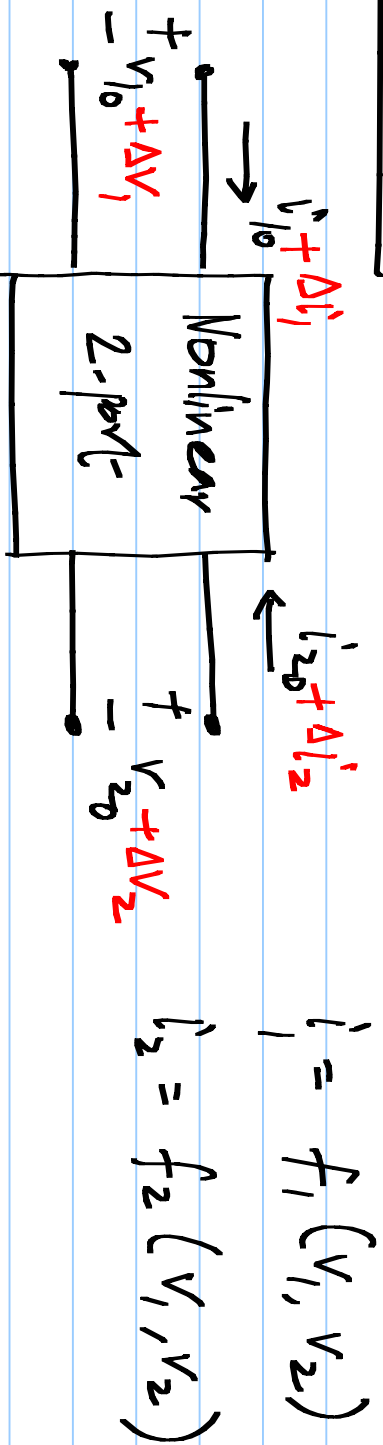


EC1010: Lecture 20

OP-POINT: $v_{10}, v_{20}, i_{10}, i_{20}$



$$\Delta i_1 = \frac{\partial f_1}{\partial v_1} \Delta v_1 + \frac{\partial f_1}{\partial v_2} \Delta v_2$$

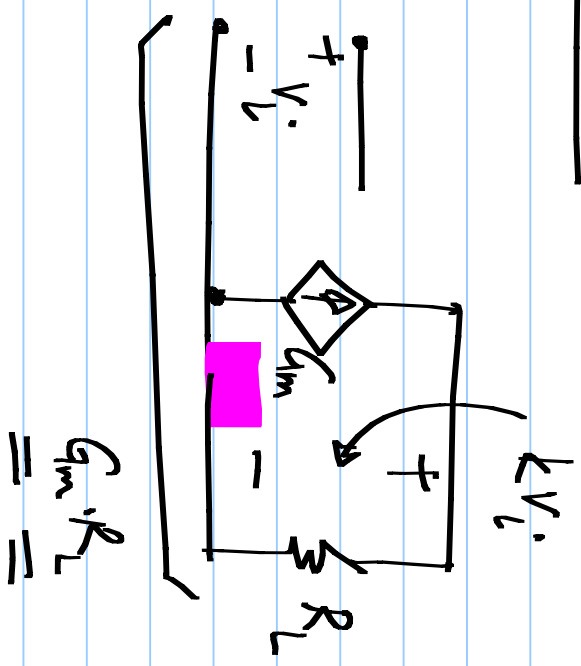
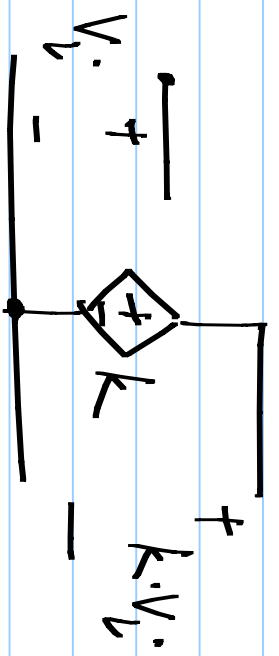
$$\Delta i_2 = \frac{\partial f_2}{\partial v_1} \Delta v_1 + \frac{\partial f_2}{\partial v_2} \Delta v_2$$

Incremental (small-signal)

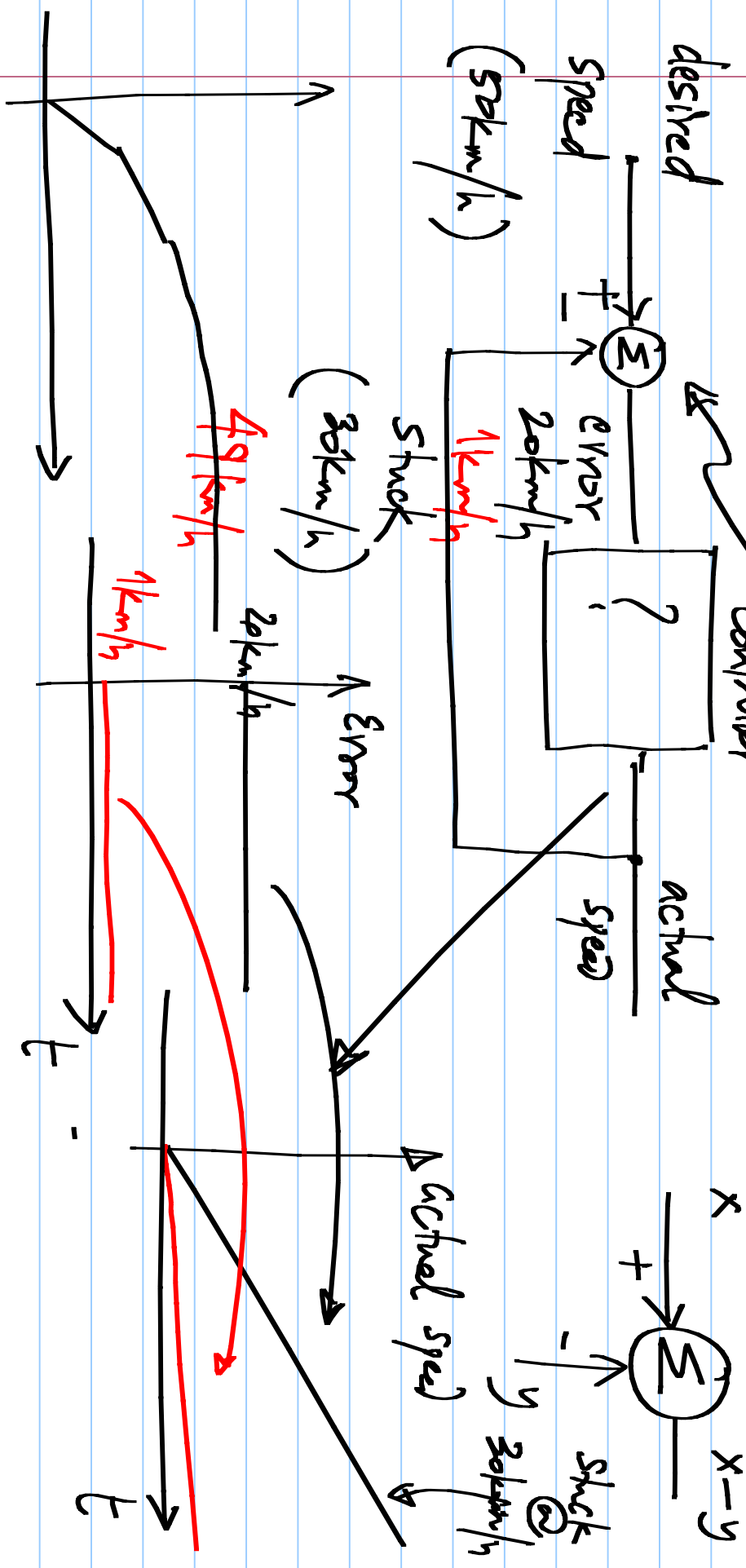
y-Parameters

Goal: Realize an amplifier of gain k

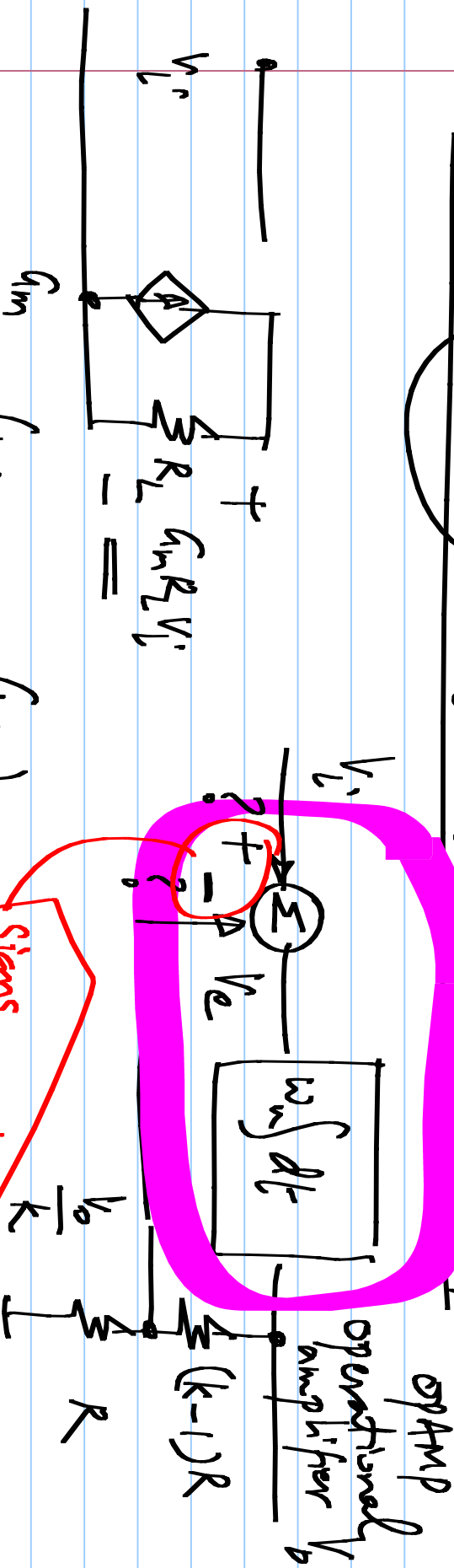
$V_D = k V_i$



Speed control : Speed comparison



Realize $V_o = kV_i$ using negative feedback

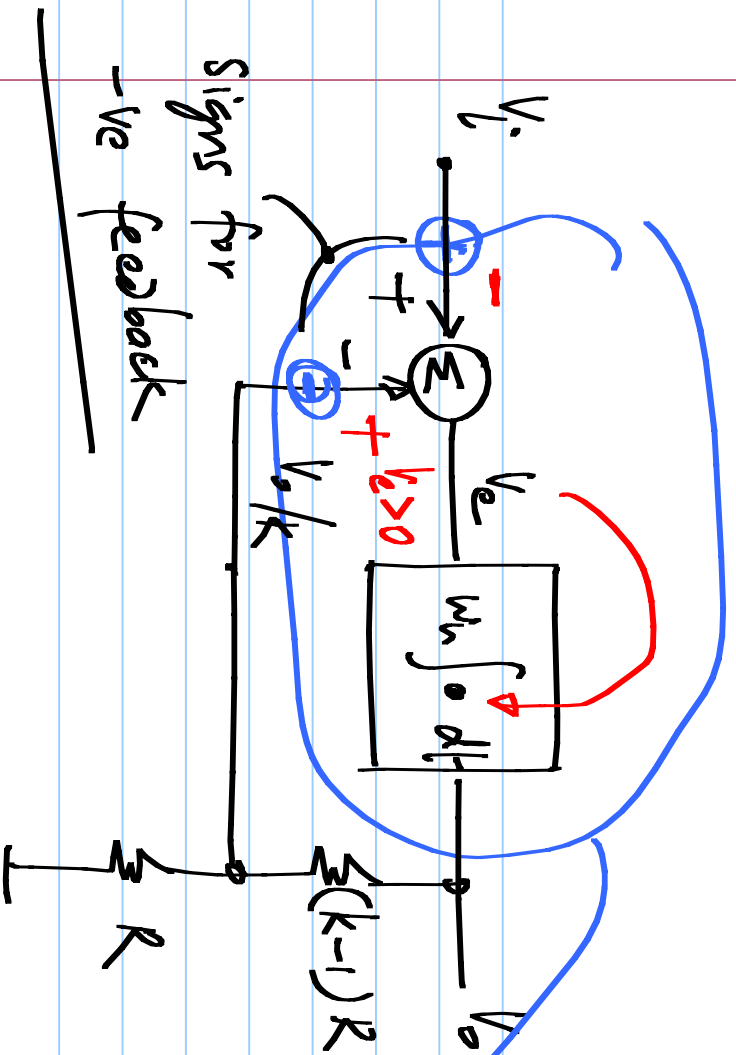


Signs for negative ϕ_b .

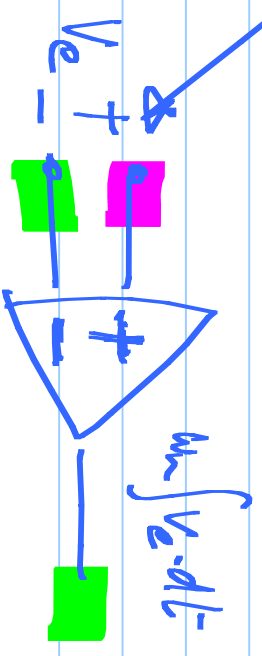
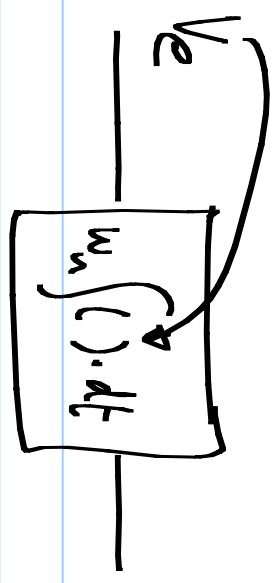
- * Compare actual with desired (kV_i)
- * Drive actual output to minimize error

Negative feedback

$$V_o = kV_i$$



- * Need to obtain $V_o = kV_i$
or $V_o - kV_i = 0$
- * Compare the V_o to V_i .
- * Drive the V_o in the right direction



Integrator: opamp

