UNIVERSITY OF CALIFORNIA AT BERKELEY
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Mike Chen	**(Due 2/12/04)**	**Spring 2004**

1) Given the circuit in Figure 1, assume M1 and M2 are transistors with the same parameters: K', W/L, r_o, γ=0, Vto. A current source Iss with output impedance Rss drives the differential pair. Input CM voltage is Vic and supply voltage is Vdd. Answer the following questions in terms of these parameters and resistor values given in the figure.
    a) Calculating the DC operation points of all the nodes. (Assume Rss >> R2, 1/gm of M1 and M2, both transistors in saturation)
    b) What is the maximum Vic such that M1 and M2 stay in saturation region?
    c) What is the small-signal voltage gain (Vo1-Vo2)/(Vi1-Vi2)? (Assume M1, M2 in saturation)
    d) If the input CM changes from Vic to (Vic+ΔV), what happens to output voltages? Quantify it. (Assume M1, M2 in saturation, ΔV<<Vic)

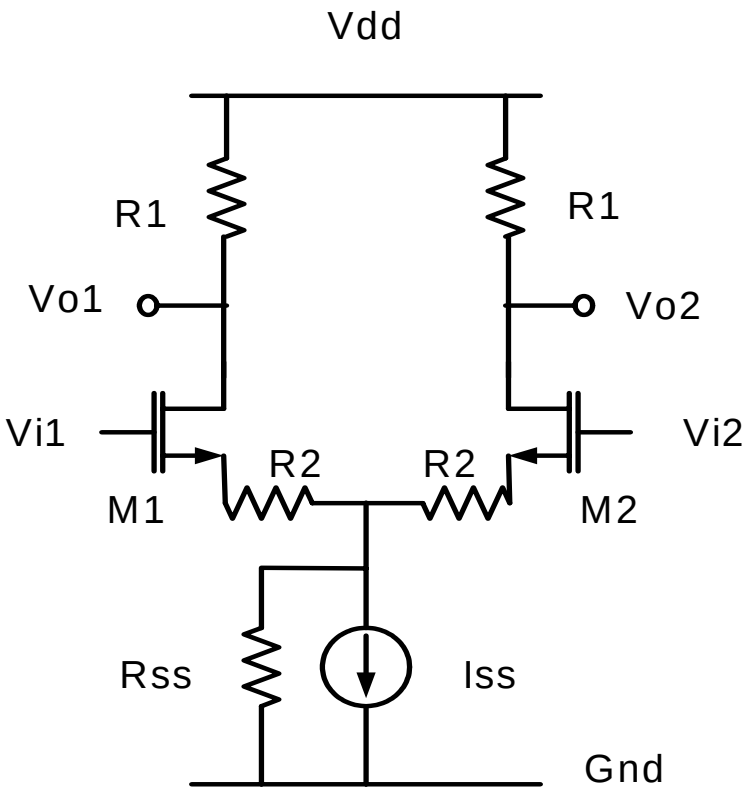

Figure 1