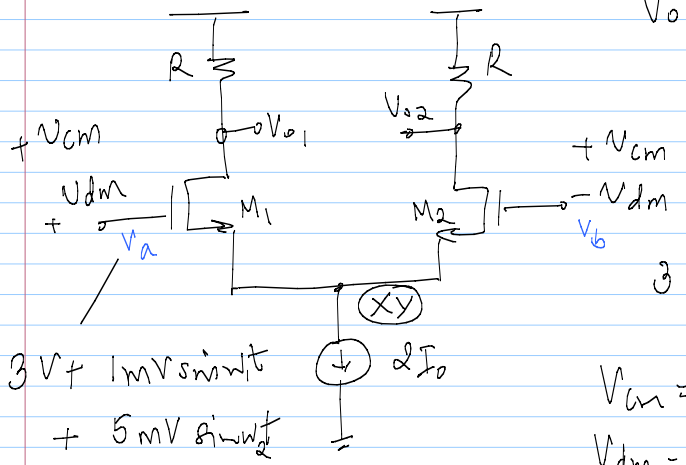
17/10/2014

lec 36

$V_{ocm} = V_{DD} - I_0 R$

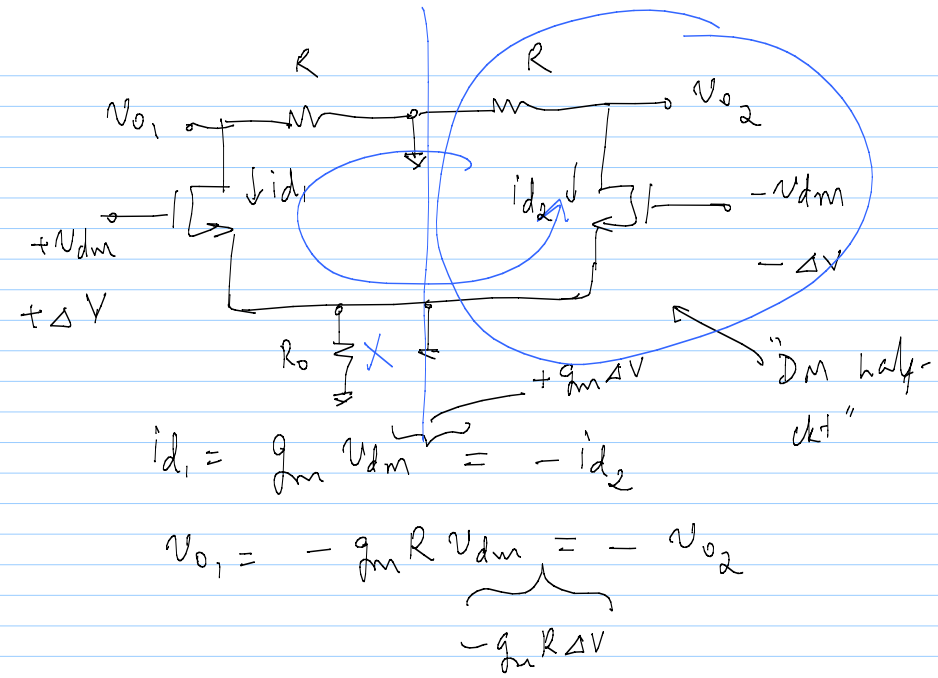
$v_{ocm} = \frac{-R}{2R_0} \cdot 5mV \sin\omega_2 t$

$V_o = V_{o_1} - V_{o_2}$



$V_{cm} = 3.1V$

$V_{dm} = -0.1V + 1mV\sin\omega t$



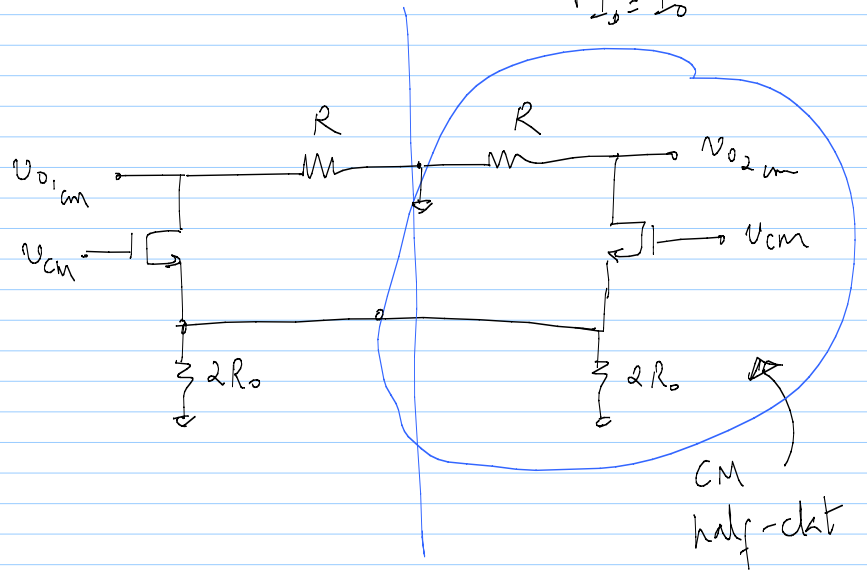
$i_{d_1} = g_m v_{dm} = -i_{d_2}$

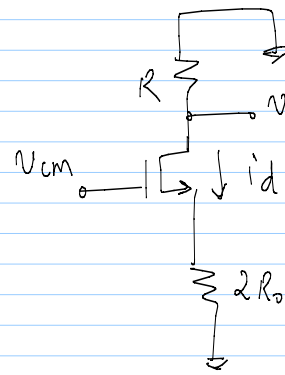
$v_{o_1} = -g_m R v_{dm} = -v_{o_2}$

$-g_m R \Delta V$

$V_{xy_{dc}} = V_{cm_{dc}} - V_{GS_{1,2}}$

$I_1 = I_0$





$v_{o_{cm}} = -\frac{R}{2R_0} \cdot v_{cm}$

$\frac{i_d}{v_{cm}} = \frac{g_m}{1 + 2g_m R_0}$

$\approx \frac{1}{2R_0}$

$g_m >> \frac{1}{2R_0}$

(A_{dm}) DM gain $=$ $\dfrac{\text{output dm voltage}}{\text{input dm voltage}}$

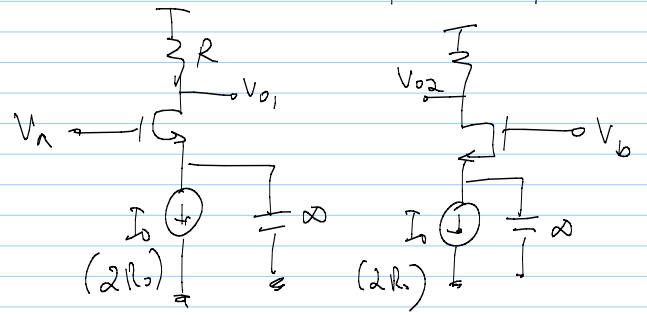
$= \dfrac{-2 g_m R V_{dm}}{2 V_{dm}} = -g_m R$

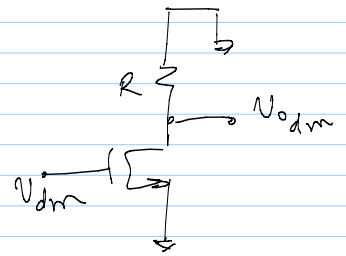
(A_{cm}) CM gain $=$ $\dfrac{\text{o/p CM voltage}}{\text{i/p CM voltage}}$

$= -R/2R_o$

CMRR $\equiv$ Common-mode rejection ratio

$\equiv \left| \dfrac{A_{dm}}{A_{cm}} \right|$ as large as possible





$A_{dm} = -g_m R$

$A_{cm} = -g_m R$

DM H.C. same as CM H.C.

CMRR $= 1$