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\[ V_{om} = V_{CM} + V_{d} \]

\[ V_{op} = V_{om} + \frac{9mR V_{d}}{1 + 2g_{m}R_{o}} \]

\[ q_m \gg \frac{1}{2R_o} \]

\[ V_{om} = -q_m R V_d - \frac{R}{g_m R_o} V_{cm} \]

Common mode gain

\[ \text{DM gain} \gg \text{CM gain} \]

CMRR = Common mode rejection ratio

\[ = \left| \frac{A_{DM}}{A_{CM}} \right| = \frac{q_m R}{R/2R_o} = 2g_m R_o \]
\[ V_a = 1 \text{mV} \]
\[ V_b = 0 \text{mV} \]

Diagram with labeled components and connections.
\[ i_{out} = \text{total current flowing in} \]

\[ \Rightarrow \frac{V_o}{V_d} = \infty \]