IIT ROORKEE

NPTEL ONLINE CERTIFICATION COURSE

MICRORLECTRONICS: DEVICES TO CIRCUITS

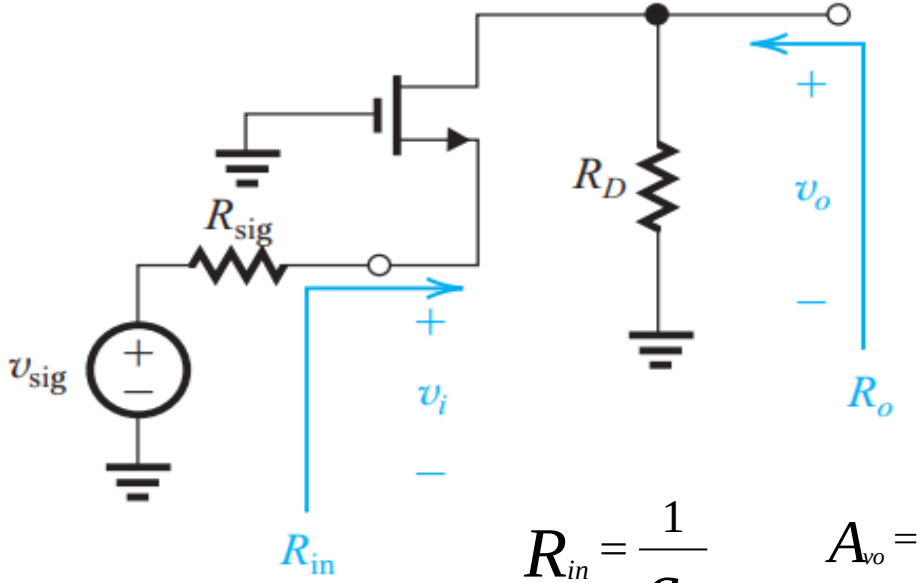
CMOS CG/CD Amplifier Configuration

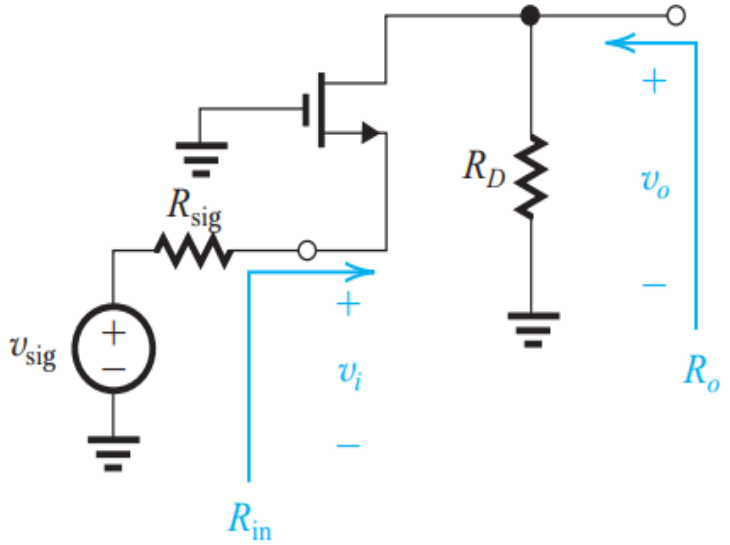
SUDEB DASGUPTA

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING



Common Gate (CG) Amplifier





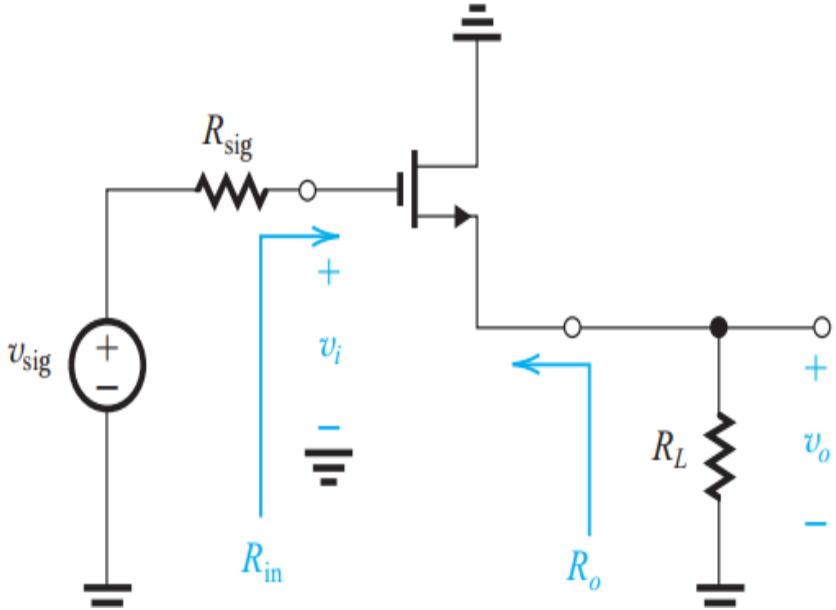
$$R_{in} = \frac{1}{g_m}$$

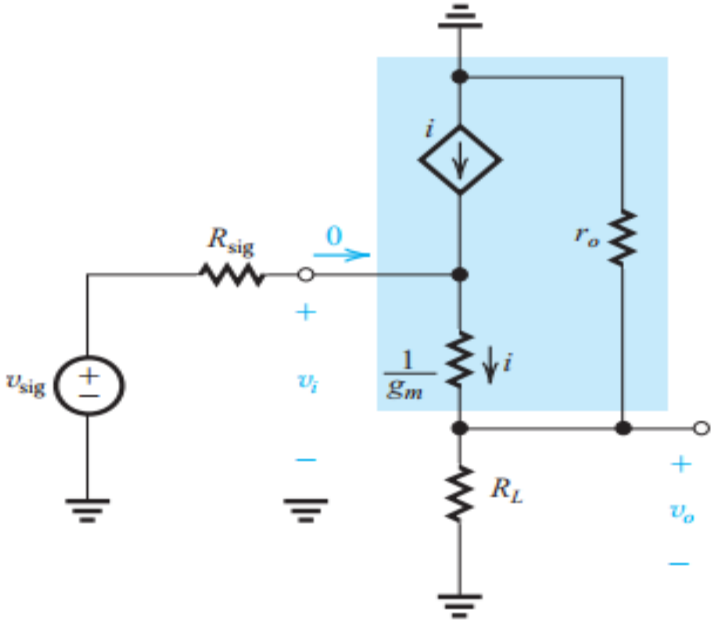
$$A_{vo} = g_m R_D$$

$$R_o = R_D$$

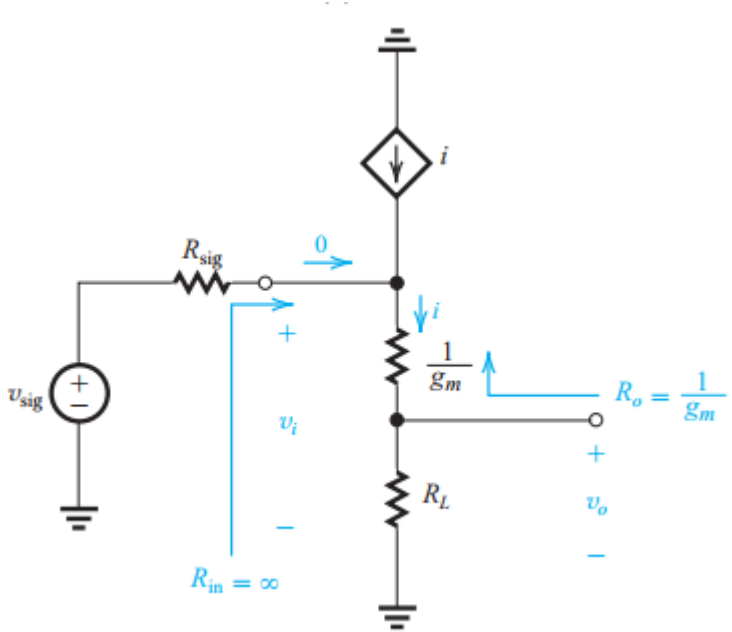
Source: Microelectronics Circuits, Sedra and Smith, Fifth edition

Common Drain (CD) Amplifier or Source follower





Source: Microelectronics Circuits, Sedra and Smith, Fifth edition



$$R_o = \frac{1}{g_m}$$

$$A_{vo} = 1$$

$$R_{in} = \infty$$

Source: Microelectronics Circuits, Sedra and Smith, Fifth edition

Recapitulation

Configuration	Voltage gain	Current gain	Input resistance	Output resistance
Common source	$A_v > 1$	—	R_{TH}	Moderate to high
Source follower	$A_v \cong 1$	—	R_{TH}	Low
Common gate	$A_v > 1$	$A_i \cong 1$	Low	Moderate to high

Source: Microelectronics Circuit Analysis and Design Donald A. Neamen, Fourth edition

Thank You