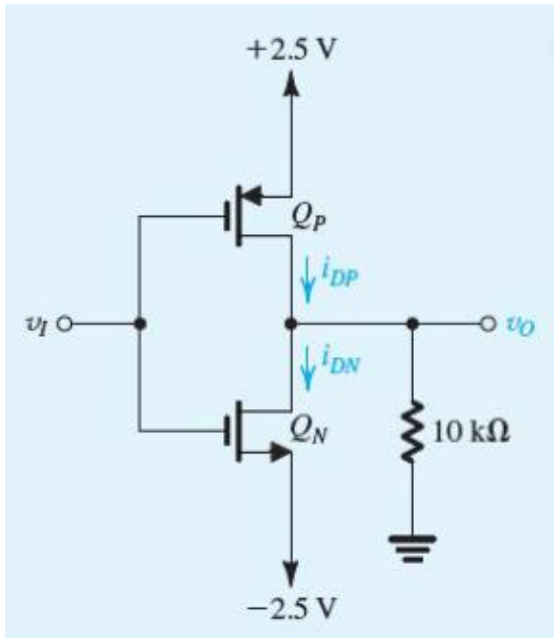


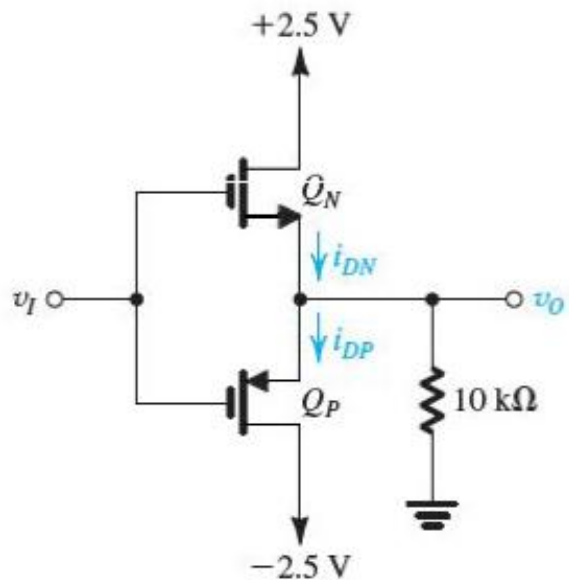
Last Lecture → Example 5.8

Assuming matched NMOS and PMOS transistors with $V_{thn} = -V_{thp} = 1V$, $K_n = K_p = 1mA/V^2$ and $\lambda = 0$, find the drain currents I_{Dn} and I_{Dp} , as well as the voltage v_o , for $v_i = 0V$, $+2.5V$, and $-2.5V$.



Exercise 5.15

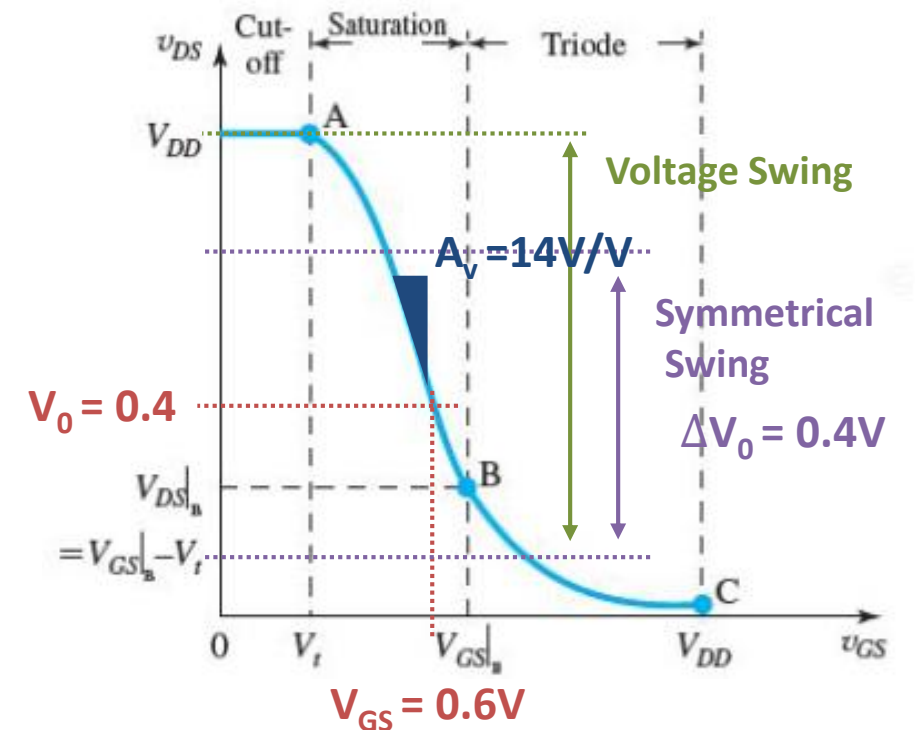
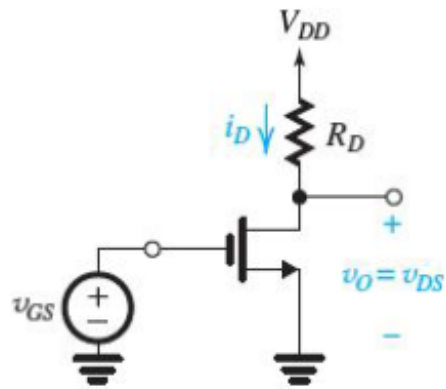
Assuming matched NMOS and PMOS transistors with $V_{thn} = -V_{thp} = 1V$, $K_n = K_p = 1mA/V^2$ and $\lambda = 0$, find the drain currents I_{Dn} and I_{Dp} , as well as the voltage v_o , for $v_i = 0V$, $+2.5V$, and $-2.5V$.



MOSFET Biasing for Amplification

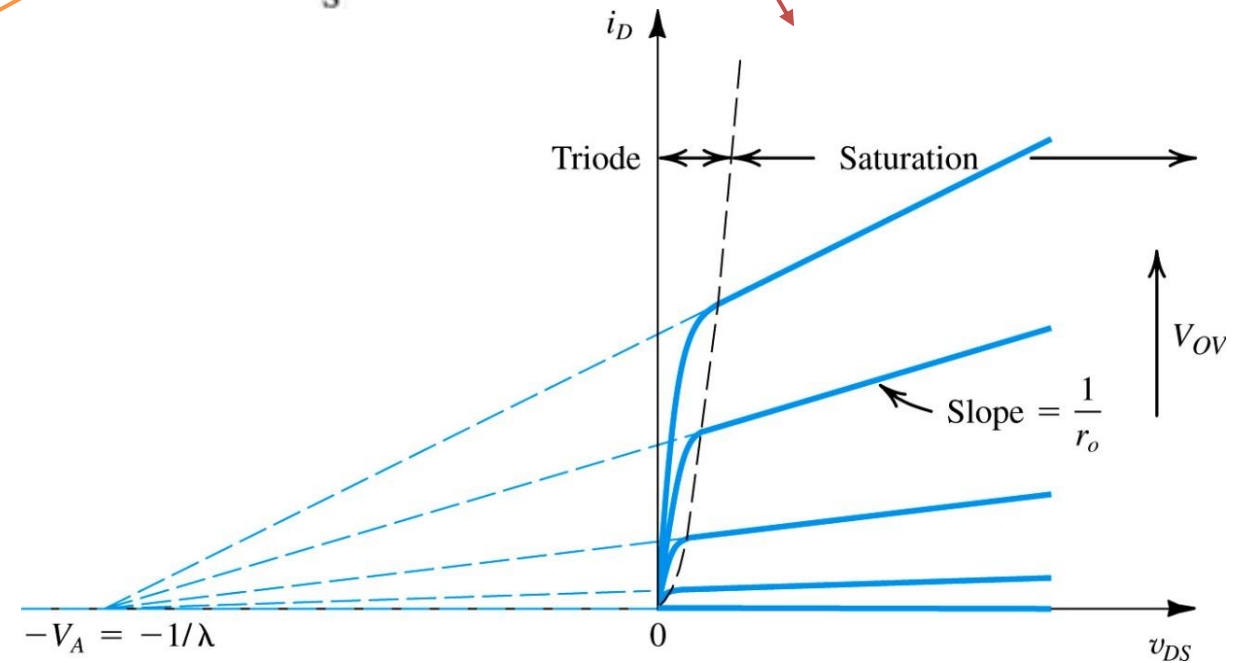
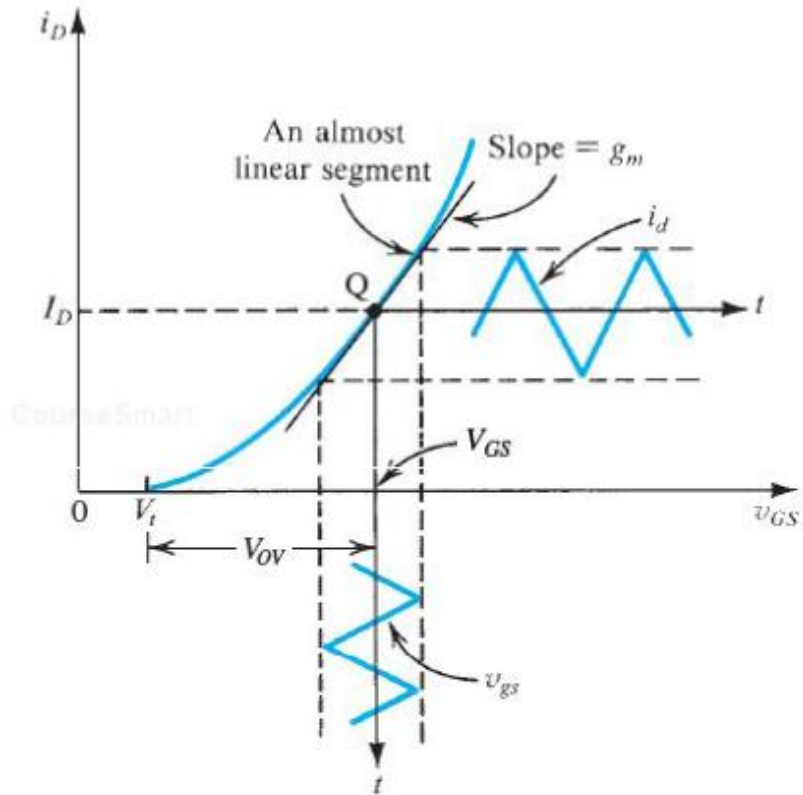
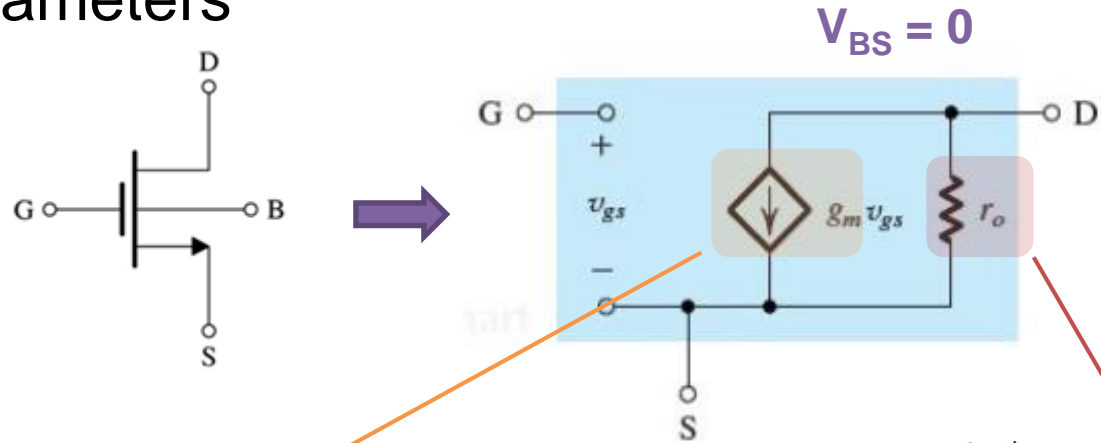
For the given common source amplifier, assuming is operating in the saturation region with $V_{th} = 0.4V$, $K_n = 4mA/V^2$, $V_{DD} = 1.8V$, $R_D = 17.5k\Omega$, and $\lambda = 0$,

- find the bias point for a voltage gain of $-14V/V$ and
- determine the maximum symmetrical signal swing allowed at the drain.
- determine the resistance seen by the gate and the drain of the transistor



MOSFETs Small Signal Parameters

- Trans-conductance (g_m)
- Output Impedance (r_o)
- Input Impedance



Example 5.10

For the given circuit, determine the small-signal voltage gain, and its input resistance. The transistor has $V_{th} = 1.5V$, $K_n = 250\mu A/V^2$, and $\lambda = 0.02V^{-1}$.

DC Bias

- $I_D = 1.06mA$
- $V_{ov} = 2.9V$

