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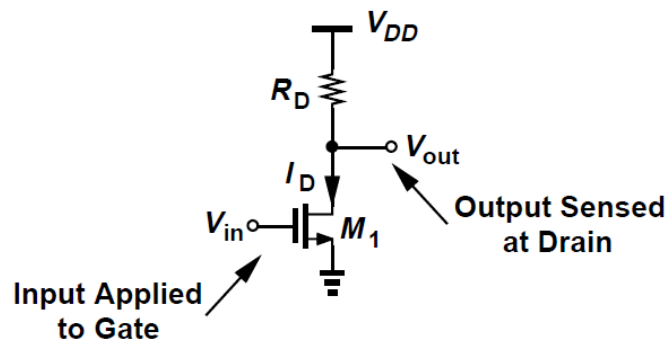
## Tutorial 10

### The MOS Transistor as an Amplifier

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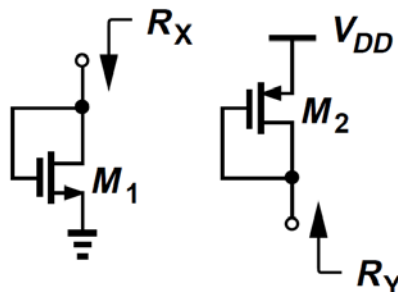
#### Problem 1

Determine the expressions of the small-signal gain, input and output impedances of the following common source amplifier.



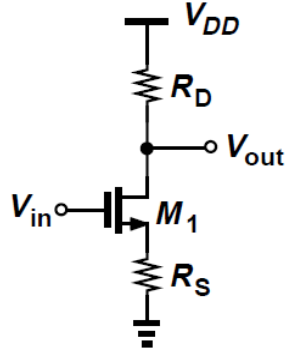
#### Problem 2

Determine the small-signal resistances  $R_X$  and  $R_Y$ .



### **Problem 3**

For the following common source stage with source degeneration, compute the output impedance (impedance looking into the drain) and impedance looking into the source. Compute the small-signal voltage gain of the circuit.



### **Problem 4**

Assuming all MOSFETs are in saturation, calculate the small-signal voltage gain of the following circuit. Consider channel length modulation and neglect body effect.

