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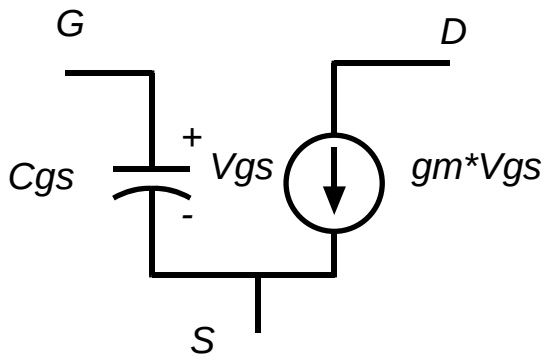
<td> 
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<td>The problems below will use the following small signal model for the mosfet.</td>
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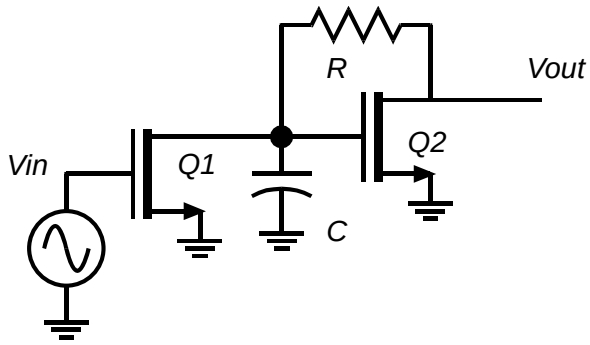
<td> 
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<td>Problem 1: This is a transconductance-transimpedance amplifier. Ignore DC bias analysis. You don't need it. The two transistors have transconductance gm1 and gm2 respectively. Their output resistances Rds1 and Rds2 are both infinity. gm1=10 mS. gm2=20 mS. R=1kOhm. C=20 pF, Cgs=0 fF
a) Draw a small-signal equivalent circuit of the circuit
b) Find, by nodal analysis, a small-signal expression for Vout(s)/Vin(s)c) Find any/all pole and zero frequencies of the transfer function, in Hz:
d)Draw a clean Bode Plot of Vout/Vin, LABEL AXES, LABEL all relevant gains and pole or zero frequencies, Label Slopes</td>
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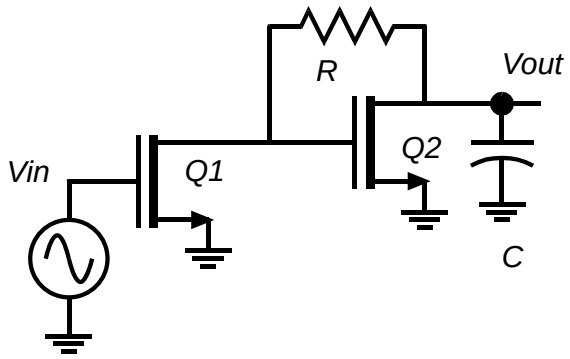
<td> 
</td>
<td>Problem 2: Here again is a transconductance-transimpedance amplifier. Ignore DC bias analysis. You don't need it. The two transistors have transconductance gm1 and gm2 respectively. Their output resistances Rds1 and Rds2 are both infinity. gm1=10 mS. gm2=20 mS. R=1kOhm. C=20 pF. Cgs=0 fF (a) Draw a small-signal equivalent circuit of the circuit
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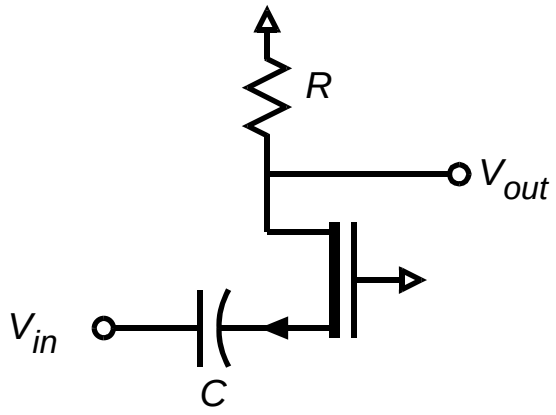
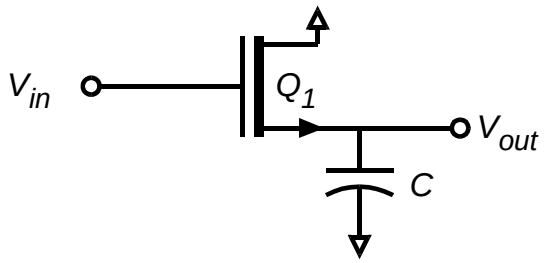
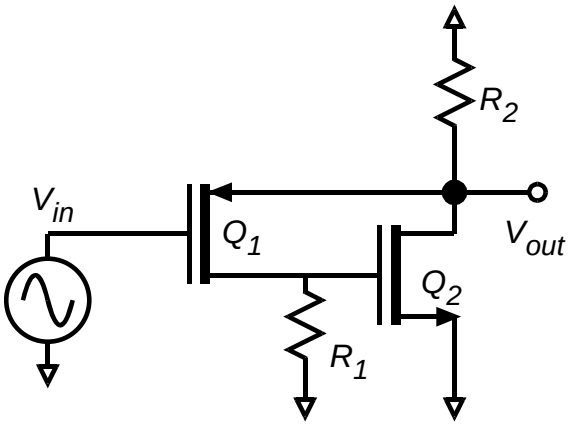
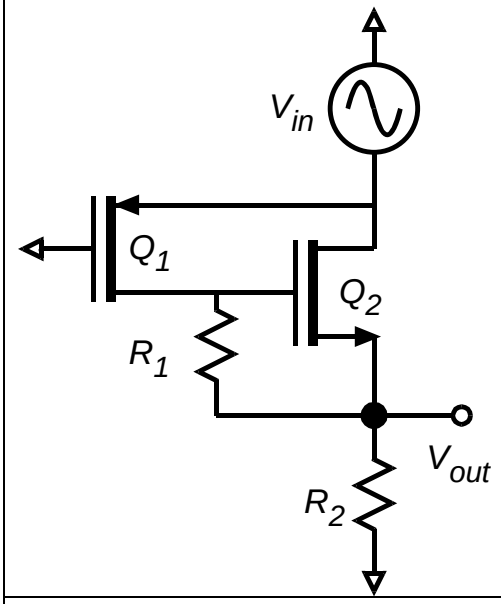
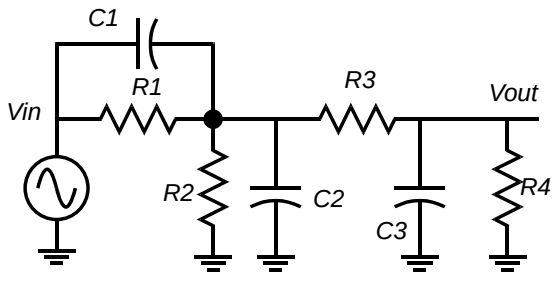
	Slopes
	Problem 3: Ignore DC bias analysis. You don't need it. The transistor has transconductance gm. Its output resistance Rds is infinity. (a) Draw a small-signal equivalent circuit of the circuit. (b) gm=5 mS. C=50 pF. R=200 Ohms Find, by nodal analysis, a small-signal expression for Vout(s)/Vin(s) (c) Find any/all pole and zero frequencies of the transfer function, in Hz: Draw a clean Bode Plot on semilog paper of Vout/Vin, LABEL AXES, LABEL all relevant gains and pole or zero frequencies, Label Slopes (d) Vin(t) is a 100 mV amplitude step-function Find Vout(t), and plot it below. Label axes, show initial and final values, show time constants
	Problem 4: Ignore DC bias analysis. You don't need it. The transistor has transconductance gm. Its output resistance Rds is infinity. (a) Draw a small-signal equivalent circuit of the circuit. (b) gm=5 mS. C=50 pF. R=200 Ohms Find, by nodal analysis, a small-signal expression for Vout(s)/Vin(s) (c) Find any/all pole and zero frequencies of the transfer function, in Hz: Draw a clean Bode Plot on semilog paper of Vout/Vin, LABEL AXES, LABEL all relevant gains and pole or zero frequencies, Label Slopes (d) Vin(t) is a 100 mV amplitude step-function Find Vout(t), and plot it below. Label axes, show initial and final values, show time constants



Problem 5: Ignore DC bias analysis. You don't need it. The two transistors have transconductance gm1 and gm2 respectively. Their drain-source resistances Rds1 and Rds2 are both infinity. (a) Draw a small-signal equivalent circuit of the circuit (t) Find, by nodal analysis, a small-signal expression for Vout/Vin



Problem 6: Ignore DC bias analysis. You don't need it. The two transistors have transconductance gm1 and gm2 respectively. Their drain-source resistances Rds1 and Rds2 are both infinity. (a) Draw a small-signal equivalent circuit of the circuit (t) Find, by nodal analysis, a small-signal expression for Vout/Vin



Problem 7: R1=2 KOhm R2=2 KOhm R3=1 KOhm R4=6 KOhm
C1= 2 nF C2=4 nF C3=6 nF
Using Nodal analysis , find the transfer function Vout(s)/Vgen(s). Give the answer in standard form

$$\frac{V_{out}(s)}{V_{gen}(s)} = \left.\frac{V_{out}}{V_{gen}}\right|_{DC} \frac{1 + b_1 s + b_2 s^2 + \ldots}{1 + a_1 s + a_2 s^2 + \ldots}$$