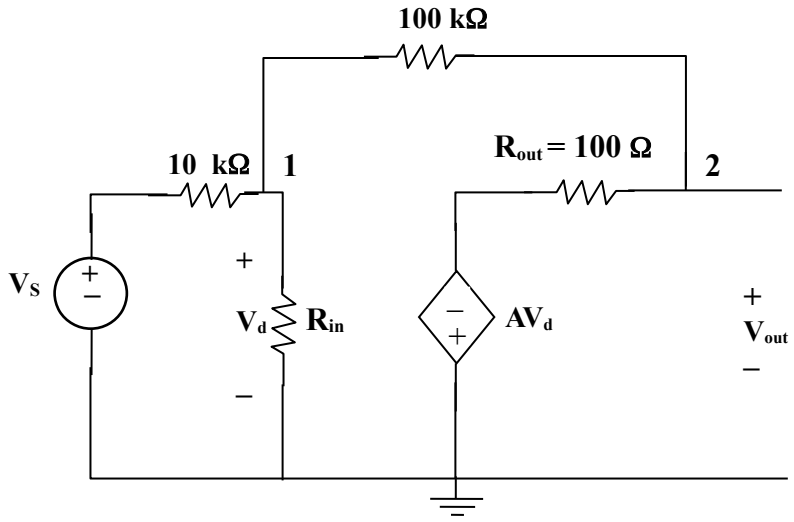
Chapter 5, Solution 7.



At node 1, $(V_S - V_1)/10\text{ k} = [V_1/100\text{ k}] + [(V_1 - V_0)/100\text{ k}]$

$$10 V_S - 10 V_1 = V_1 + V_1 - V_0$$

which leads to $V_1 = (10V_S + V_0)/12$

At node 2, $(V_1 - V_0)/100\text{ k} = (V_0 - (-AV_d))/100$

But $V_d = V_1$ and $A = 100{,}000$,

$$V_1 - V_0 = 1000\,(V_0 + 100{,}000V_1)$$

$$0 = 1001V_0 + 99{,}999{,}999[(10V_S + V_0)/12]$$

$$0 = 83{,}333{,}332.5\,V_S + 8{,}334{,}334.25\,V_0$$

which gives us $(V_0/ V_S) = -10$ (for all practical purposes)

If $V_S = 1$ mV, then $V_0 =$ **–10 mV**

Since $V_0 = A\,V_d = 100{,}000\,V_d$, then $V_d = (V_0/10^5)\,V =$ **–100 nV**