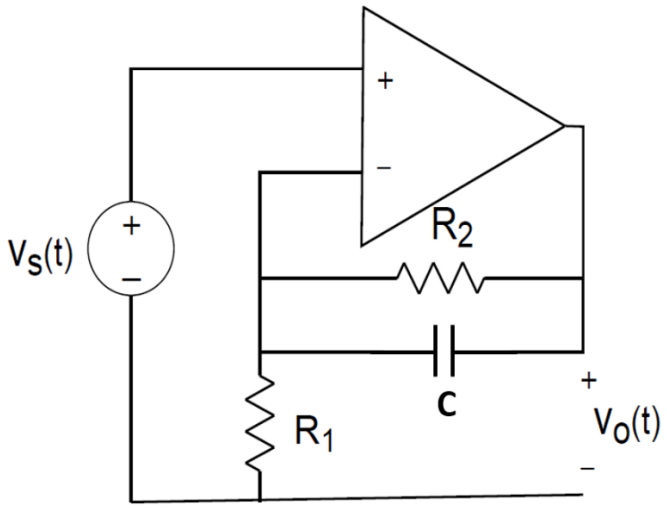
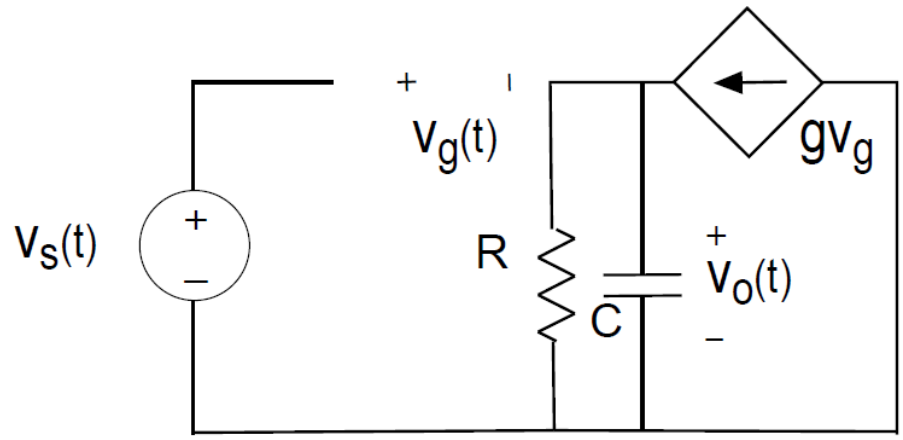
Homework 5

Problem 1 (4 pt)
Find the differential equation for v_o in the opamp circuit below (You don't need to solve the equation). Assume the opamp is ideal with infinite gain.

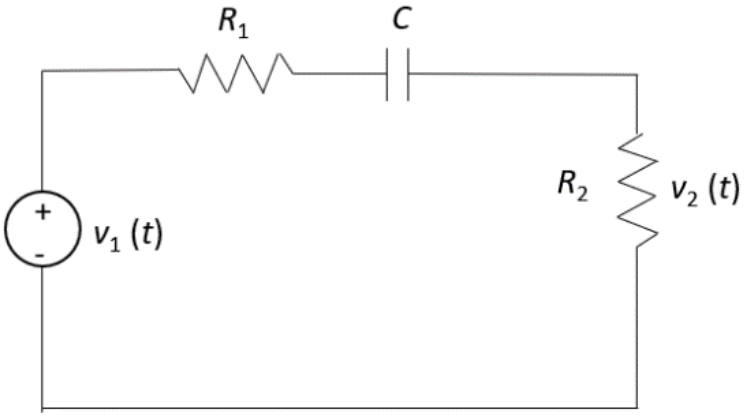


Problem 2 (5 pt)
The circuit below is a model of a MOS common drain amplifier where v_s is the input voltage and v_o is the output.
a) Find the differential equation for v_o.(3 pt)
b) If $v_o(0) = 0$ and if $v_s(t) = 1$ V for $t > 0$, what is the solution for $v_o(t)$ for $t > 0$. (Consider R, C, g are known; **note** that V_g is not known) (2 pt)



Problem 3 (5 pt)

In the circuit below, R_1 = 1 KΩ, R_2 = 2 KΩ, and C = 3 μF. Assume the initial rest conditions (namely v_1 has been 0 V for a long time), and assume that v_1 has a 6-volt step at t = 0 (namely it jumps from 0 to 6 V). Find $v_2(t)$ for t >0. Show the details (4 pt). Also please sketch $v_2(t)$ (1 pt).



Problem 4 (6 pt)

In the circuit below, R_1, R_2, C_1, C_2 and V_o are known. Assume that the switch has stayed at **1** for a long time and now at t =0 moves from 1 to 2. Find v (t) for t >0.