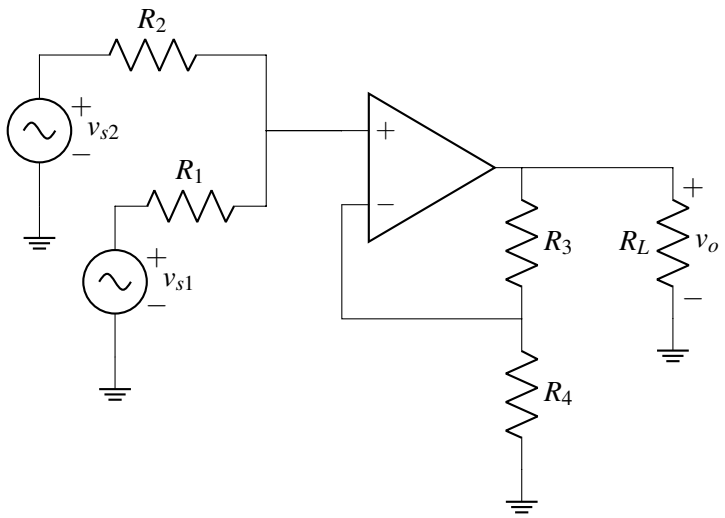
EECS 16A Designing Information Devices and Systems I
Fall 2021 Discussion 11A

1. Multiple Inputs To One Op-Amp

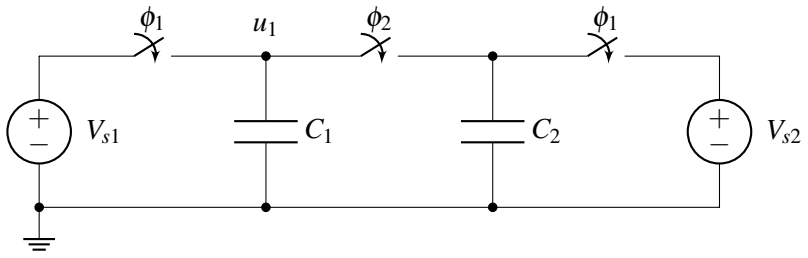


(a) For the circuit above, find an expression for v_o. *(Hint: Use superposition.)*

(b) How could you use this circuit to find the sum of different signals, i.e. $V_{s1} + V_{s2}$? What about taking the sum and adding multiplying by 2, i.e. $2(V_{s1} + V_{s2})$?

2. Capacitive Charge Sharing (from Spring 2020 Midterm 2)

Consider the circuit below with $C_1 = C_2 = 1\,\mu\text{F}$ and three switches ϕ_1, ϕ_2. Suppose that initially the switches ϕ_1 is closed and ϕ_2 is open such that C_1 and C_2 are charged through the corresponding voltage sources $V_{s1} = 1\,\text{V}$ and $V_{s2} = 2\,\text{V}$.



(a) How much charge is on C_1 and C_2? How much energy is stored in each of the capacitors? What is the total stored energy?

(b) Now suppose that some time later, switch ϕ_1 opens and switch ϕ_2 closes. What is the value of voltage u_1 at steady state?