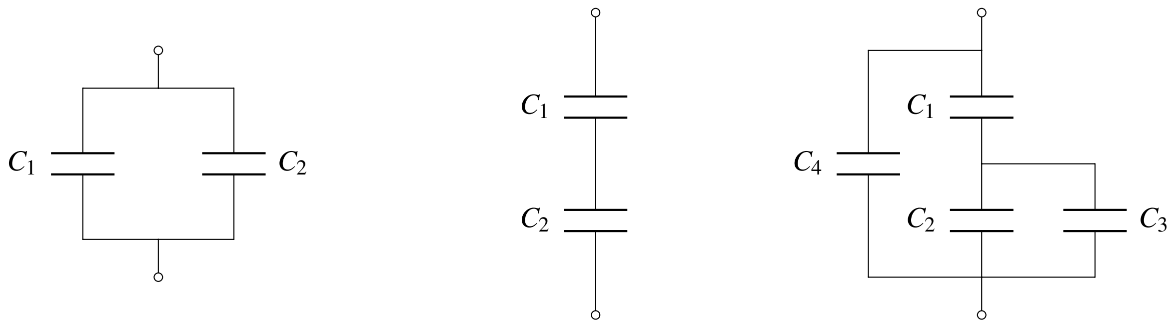
1. **Series And Parallel Capacitors**

   Derive C_{eq} for the following circuits.

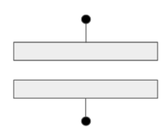
   (a) (b) (c)



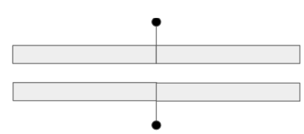
2. **Capacitance Equivalence**

   For the structures shown below, assume that the plates have a depth L into the page and a width W and are always a distance d apart.

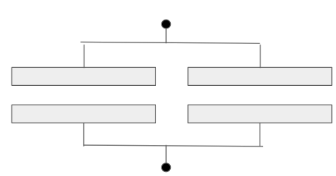
   (a) What is the capactance of the structure shown below?



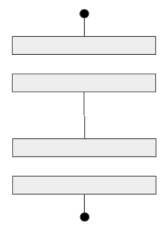
   (b) Suppose that we take two such structures and put them next to each other as shown below. What is the capacitance of this new structure?



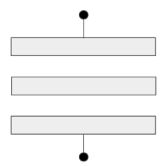
   (c) Now suppose that rather than connecting the together as shown above, we connect them with an ideal wire as shown below. What is the capacitance of this structure?



   (d) Suppose that we now take two capacitors and connect them as shown below. What is the capacitance of the structure?



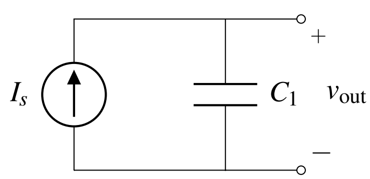
(e) What is the capacitance of the structure shown below?



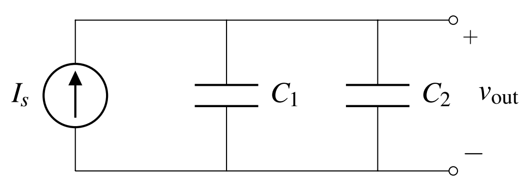
3. Current Sources And Capacitors

For the circuits given below, give an expression for $v_{\text{out}}(t)$ in terms of I_s, C_1, C_2, and t. Assume that all capacitors are initially uncharged.

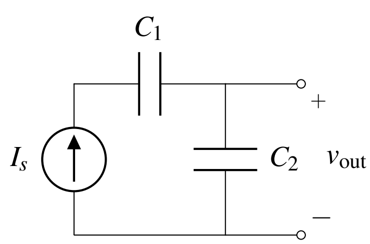
(a)



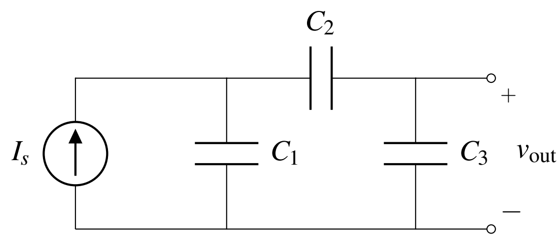
(b)



(c)



(d)


C_2
+
I_s
C_1
C_3
v_{out}
−