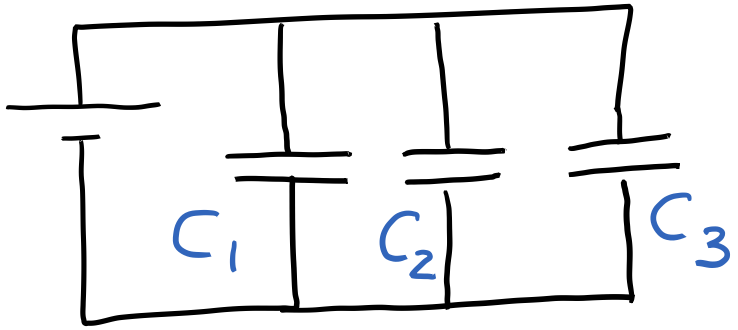
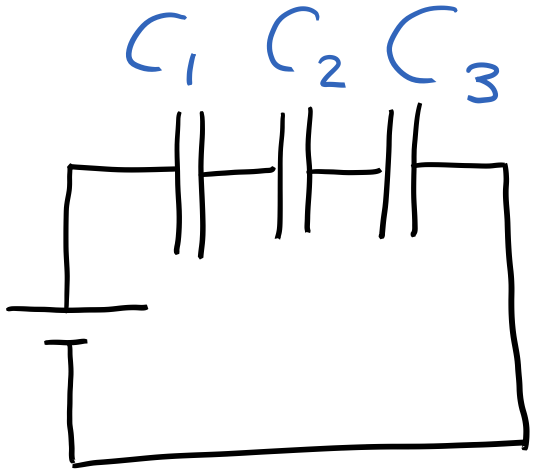
Lecture 10: Capacitor networks

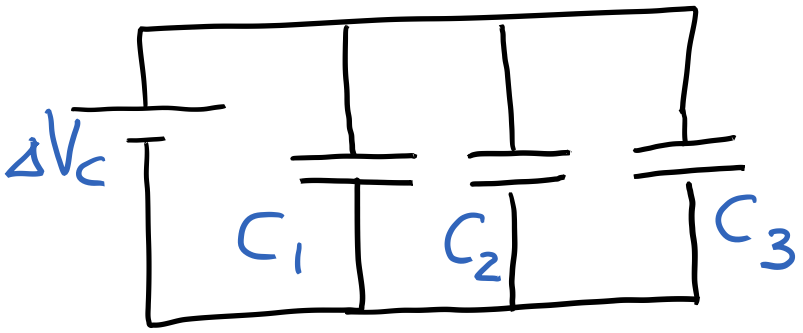


in parallel



in series

Capacitors in parallel



in parallel

ΔV_c same for all capacitors

C_1 stores $Q_1 = C_1 \Delta V$

C_2 stores $Q_2 = C_2 \Delta V$

C_3 stores $Q_3 = C_3 \Delta V$

$$Q_{net} = \left(\sum C_i\right) \Delta V$$

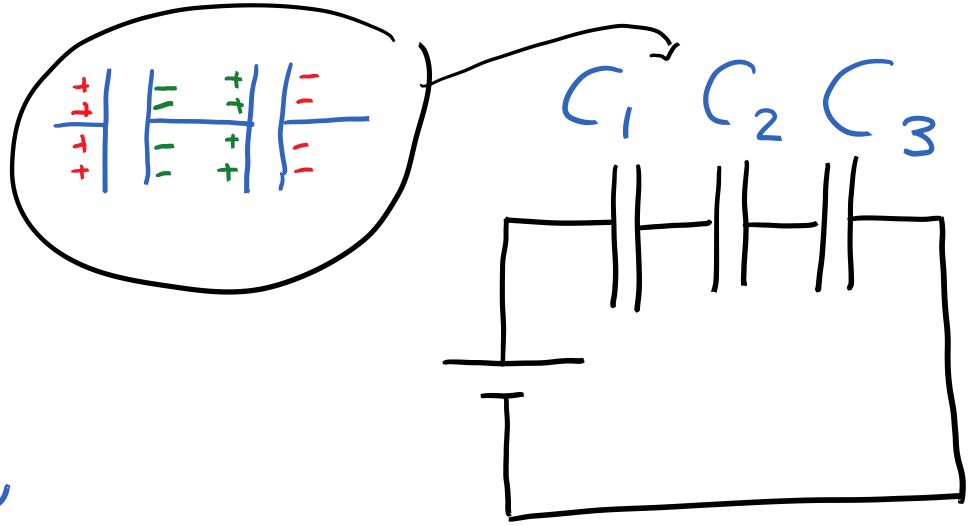
$$C_{eq} = \sum_i C_i$$

equivalent capacity

Capacitors in series

$$\Delta V_1 + \Delta V_2 + \Delta V_3 = \Delta V$$

$$Q_1 = Q_2 = Q_3 = Q_{net}$$



$$\frac{\Delta V_1}{Q_1} + \frac{\Delta V_2}{Q_2} + \frac{\Delta V_3}{Q_3} = \frac{\Delta V}{Q_{net}}$$

$$\frac{1}{C_1} + \frac{1}{C_2} + \frac{1}{C_3} = \frac{1}{C_{eq}}$$

in series

$$\frac{1}{C_{eq}} = \sum_i \frac{1}{C_i}$$

$$C_{eq} = \left(\sum_i \frac{1}{C_i} \right)^{-1}$$

Ex. 23.10