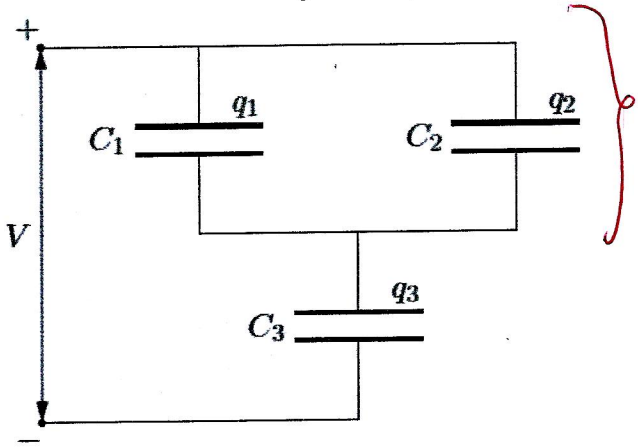
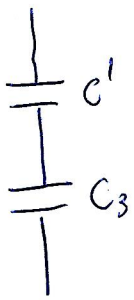
2) Considere o sistema esquematizado na figura.
(1,0): a) Determine a capacitância C equivalente do circuito em função de C_1, C_2, C_3.
(1,0): (b) Determine as cargas q_1, q_2 e q_3 considerando $C_1=C_2=C_3=C_0$.

$Q=CV$; $C_P = \sum C_i$; $\frac{1}{C_s} = \sum \frac{1}{C_i}$



Ligação em paralelo

$C' = C_1 + C_2$



Ligação em série

$\frac{1}{C} = \frac{1}{C'} + \frac{1}{C_3}$

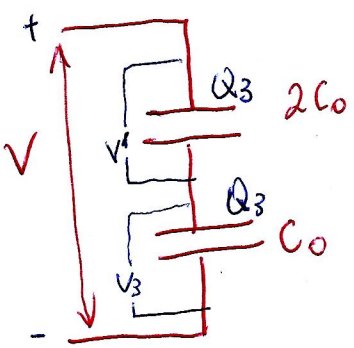
$\frac{1}{C} = \frac{1}{C_1+C_2} + \frac{1}{C_3}$

$\frac{1}{C} = \frac{C_3 + C_1+C_2}{C_3(C_1+C_2)}$

$C = \frac{C_3(C_1+C_2)}{C_1+C_2+C_3}$

Quando $C_1=C_2=C_3=C_0$

$C' = 2C_0$



$C = \frac{C_0(2C_0)}{3C_0} = \frac{2C_0}{3}$

Mas capacitores em série tem a mesma carga

$V = V' + V_3$

$V = \frac{Q_3}{2C_0} + \frac{Q_3}{C_0} = \frac{Q_3+2Q_3}{2C_0} = \frac{3Q_3}{2C_0}$

$$\boxed{Q_3 = \frac{2C_0V}{3}}$$

Os capacitores C_1 e C_2 estão no mesmo potencial V'

$\frac{q_1}{C_0} = \frac{q_2}{C_0} = V' = \frac{Q_3}{2C_0} \Rightarrow$

$$\boxed{q_1 = q_2 = \frac{Q_3}{2} = \frac{C_0V}{3}}$$