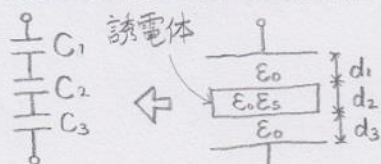


6. コンデンサの直列接続と並列接続



$$C_1 = \frac{\epsilon_0 S}{d_1} \quad C_2 = \frac{\epsilon_0 \epsilon_s S}{d_2} \quad C_3 = \frac{\epsilon_0 S}{d_3}$$

まず直列接続

今回は静電容量の合成について

$$V = V_1 + V_2 + \dots + V_n$$

$$= \frac{Q}{C_1} + \frac{Q}{C_2} + \dots + \frac{Q}{C_n}$$

直列接続の合成静電容量C

$$\frac{1}{C} = \frac{V}{Q} = \frac{1}{C_1} + \frac{1}{C_2} + \dots + \frac{1}{C_n}$$

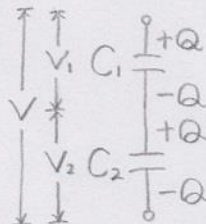
分担電圧

$$V_1 = \frac{V_1}{V} \times V$$

$$= \frac{V_1}{V_1 + V_2} V$$

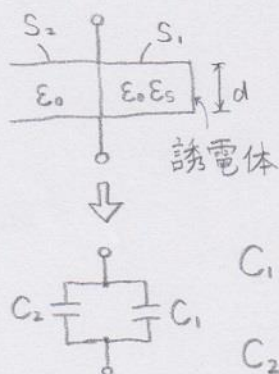
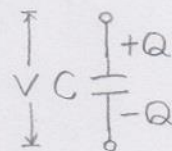
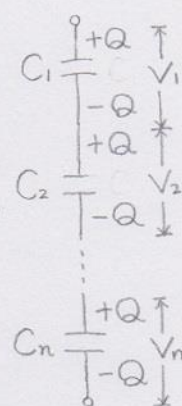
$$= \frac{\frac{Q}{C_1}}{\frac{Q}{C_1} + \frac{Q}{C_2}} V$$

$$= \frac{\frac{1}{C_1}}{\frac{1}{C_1} + \frac{1}{C_2}} V = \frac{C_2}{C_1 + C_2} V$$



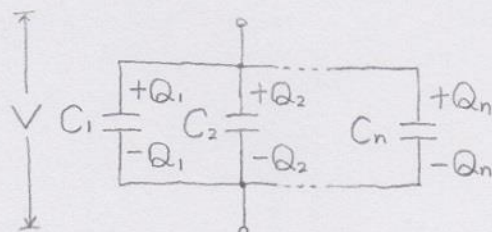
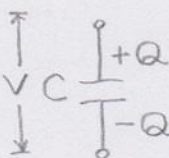
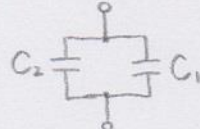
同様にして

$$V_2 = \frac{C_1}{C_1 + C_2} V$$



$$C_1 = \frac{\epsilon_0 \epsilon_s S_1}{d}$$

$$C_2 = \frac{\epsilon_0 S_2}{d}$$



$$Q = Q_1 + Q_2 + \dots + Q_n$$

$$= C_1 V + C_2 V + \dots + C_n V$$

並列接続の合成静電容量C

$$C = \frac{Q}{V} = C_1 + C_2 + \dots + C_n$$

あと、誘電体を挿入すると静電容量が増える

並列接続では合成静電容量は増加し、直列接続では減少するのね

並列接続

