

Principle of superposition for potential (continuous)

$$V_P = \int_{\text{all charge elements}} k \frac{dq}{r_q}$$

Electric potential  
Line integrals

$$\Delta V = V_B - V_A = - \int_A^B \vec{E} \cdot d\vec{l}$$

$$V_P = - \int_{\text{reference}}^P \vec{E} \cdot d\vec{l}$$

Potential energy of a system of charges

Potential energy of a system

$$U = \sum_{\text{all distinct pairs}} \frac{kQ_i Q_j}{r_{ij}}$$

$$U = \frac{1}{2} \sum_i Q_i V_i$$

Potential energy of a system of charges

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