Classical Mechanics

Principle of Energy

(Uniform Field)

Particle

$$\mathbf{a}_\mathrm{A} = \mathbf{a}_\mathrm{A}$$

$$\int \mathbf{a}_\mathrm{A} \cdot d\mathbf{r}_\mathrm{A} = \int \mathbf{a}_\mathrm{A} \cdot d\mathbf{r}_\mathrm{A}$$

$$\int \mathbf{a}_\mathrm{A} \cdot d\mathbf{r}_\mathrm{A} = \Delta\, \tfrac{1}{2}\mathbf{v}_\mathrm{A}^2$$

$$\int \mathbf{a}_\mathrm{A} \cdot d\mathbf{r}_\mathrm{A} = \Delta\, \mathbf{a}_\mathrm{A} \cdot \mathbf{r}_\mathrm{A}$$

$$\Delta\, \tfrac{1}{2}\mathbf{v}_\mathrm{A}^2 = \Delta\, \mathbf{a}_\mathrm{A} \cdot \mathbf{r}_\mathrm{A}$$

$$\Delta\, \tfrac{1}{2}\mathbf{v}_\mathrm{A}^2 - \Delta\, \mathbf{a}_\mathrm{A} \cdot \mathbf{r}_\mathrm{A} = 0$$

$$m_\mathrm{A} \left(\Delta\, \tfrac{1}{2}\mathbf{v}_\mathrm{A}^2 - \Delta\, \mathbf{a}_\mathrm{A} \cdot \mathbf{r}_\mathrm{A} \right) = 0$$

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(Uniform Field)

Biparticle

$$\mathbf{a}_{\mathrm{AB}} = \mathbf{a}_{\mathrm{AB}}$$

$$\int \mathbf{a}_{\mathrm{AB}} \cdot d\mathbf{r}_{\mathrm{AB}} = \int \mathbf{a}_{\mathrm{AB}} \cdot d\mathbf{r}_{\mathrm{AB}}$$

$$\int \mathbf{a}_{\mathrm{AB}} \cdot d\mathbf{r}_{\mathrm{AB}} = \Delta\, \tfrac{1}{2}\mathbf{v}_{\mathrm{AB}}^{2}$$

$$\int \mathbf{a}_{\mathrm{AB}} \cdot d\mathbf{r}_{\mathrm{AB}} = \Delta\, \mathbf{a}_{\mathrm{AB}} \cdot \mathbf{r}_{\mathrm{AB}}$$

$$\Delta\, \tfrac{1}{2}\mathbf{v}_{\mathrm{AB}}^{2} = \Delta\, \mathbf{a}_{\mathrm{AB}} \cdot \mathbf{r}_{\mathrm{AB}}$$

$$\Delta\, \tfrac{1}{2}\mathbf{v}_{\mathrm{AB}}^{2} - \Delta\, \mathbf{a}_{\mathrm{AB}} \cdot \mathbf{r}_{\mathrm{AB}} = 0$$

$$m_{\mathrm{AB}} \left(\Delta\, \tfrac{1}{2}\mathbf{v}_{\mathrm{AB}}^{2} - \Delta\, \mathbf{a}_{\mathrm{AB}} \cdot \mathbf{r}_{\mathrm{AB}} \right) = 0$$