

Angular Potential Energy

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Abstract

This paper presents an equation to calculate the angular potential energy of a particle.

Angular Potential Energy

The angular potential energy U_a of a particle A on which a resultant force \mathbf{F}_a acts, is given by:

$$U_a = - \int (\mathbf{r} \times \mathbf{F}_a) \cdot d(\mathbf{r} \times \mathbf{r}_a)$$

where \mathbf{r} is a position vector which is constant in magnitude and direction, and \mathbf{r}_a is the position of particle A.

If \mathbf{F}_a is constant and since $\mathbf{F}_a = m_a \mathbf{a}_a$, it follows that:

$$U_a = - m_a (\mathbf{r} \times \mathbf{a}_a) \cdot (\mathbf{r} \times \mathbf{r}_a)$$

where m_a is the mass of particle A, and \mathbf{a}_a is the constant acceleration of particle A.