

Assignment1

Anjana V

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Question

A body constrained to move along the z-axis of a coordinate system is subject to a constant force:

$$\mathbf{F} = \begin{pmatrix} 1 \\ -2 \\ 3 \end{pmatrix} \quad (1)$$

What is the work done by this force in moving the body a distance of 4 m along the z-axis?

Answer

Work done in moving an object by a distance \mathbf{s} using an external force \mathbf{F} is given by:

$$W = \mathbf{F}^T \mathbf{s} \quad (2)$$

As seen above, work done is the scalar product (dot product) of Force and distance.

Here,

$$\mathbf{s} = \begin{pmatrix} 0 \\ 0 \\ 4 \end{pmatrix} \quad (3)$$

The scalar product of the variables is given by:

$$\mathbf{F}^T \mathbf{s} = \begin{pmatrix} 1 & -2 & 3 \end{pmatrix} \begin{pmatrix} 0 \\ 0 \\ 4 \end{pmatrix} = 12 \quad (4)$$

The work done by the force \mathbf{F} is 12 J

Links

Download all the codes from [here](#)

Download the LaTeX files from [here](#)