

# Assignment1

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## 1 Question

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

$$\mathbf{F} = \begin{pmatrix} 1 \\ -2 \\ 3 \end{pmatrix} \quad (1.1)$$

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

## 2 Answer

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

$$W = \mathbf{F}^T \mathbf{s} \quad (2.1)$$

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

Here,

$$\mathbf{s} = \begin{pmatrix} 0 \\ 0 \\ 4 \end{pmatrix} \quad (2.2)$$

The scalar product of the variables is given by:

$$\mathbf{F}^T \mathbf{s} = \begin{pmatrix} 1 & -2 & 3 \end{pmatrix} \begin{pmatrix} 0 \\ 0 \\ 4 \end{pmatrix} = 12 \quad (2.3)$$

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

## Links

Download all the codes from [here](#)

Download the LaTeX files from [here](#)