

Section 6.6 Work

Work If an object moves along a straight line with position function $s(t)$, the force F on the object (in the same direction) is defined by

$$F = m \frac{d^2 s}{dt^2}$$

where m is mass and $\frac{d^2 s}{dt^2}$ is the acceleration of the object.

In the case of constant acceleration, work is the product of force and distance:

$$W = Fd.$$

When force varies, the work done in moving the object from a to b is defined as

$$W = \int_b^a f(x) dx$$

where $f(x)$ is the force acting on the object at position x .

Hooke's Law Hooke's Law states that the force required to maintain a spring stretched x units beyond its natural length is proportional to x :

$$f(x) = kx$$

where k is a positive constant (called the spring constant).