Newton's second law

February 23, 2018

The second law states that the rate of change of momentum of a body is directly proportional to the force applied, and this change in momentum takes place in the direction of the applied force.

$$\mathbf{F} = \frac{d\mathbf{p}}{dt} = \frac{d(m\mathbf{v})}{dt}$$

The second law can also be stated in terms of an object's acceleration. Since Newton's second law is valid only for constant-mass systems, m can be taken outside the differentiation operator by the constant factor rule in differentiation.

$$\mathbf{F} = m\frac{d\mathbf{v}}{dt}$$

Where $\mathbf{F}$ is the net force applied, m is the mass of the body, and $\mathbf{a}$ is the body's acceleration.